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Efficient Strategies for Playing the Horn

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EFFICIENT STRATEGIES FOR PLAYING THE HORN

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Abstract

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In their pursuit of becoming accomplished performers, horn players spend a great deal of time studying proper brass playing techniques from the great pedagogues. The modern horn is a fairly young instrument (less than two hundred years old) and the most efficient pedagogical approach is still evolving. Because of this, horn players spend a great deal of time studying proper brass playing techniques from the great pedagogues. Books by Philip Farkas, Arnold Jacobs, Raphael Mendez, and more have many theories and exercises on how to breathe, the best way to perfect embouchure development, performance techniques, and more.

Modern pedagogues have been working to find a better approach to playing the horn. They are doing this by borrowing techniques from other pedagogies, as well as introducing ideas that focus on the science and understanding of exactly what the body does to create sound. Through the study of the work of these pedagogues as well as interviewing many of them and their colleagues directly, a new routine for horn was created. This daily horn routine expands on ideas of the modern pedagogues while borrowing techniques from Body Mapping, vocal pedagogy, and more. The focus of the routine is to give students a path to playing the horn efficiently and free of excess tension and focuses on three areas specifically; long tones, flexibilities, and articulations.

Through the long tones, a performer will study and understand how the breathing apparatus works. Once that is understood, a horn player can use that knowledge to study

an efficient use of the air in order to create music. This paper provides that information, as well as techniques for putting that use into practice.

The second focus is to understand how to efficiently and accurately produce and use the embouchure. Once a proper body map of the embouchure is understood, a horn player can turn to learning the techniques that are used to change pitch and tone while avoiding excess tension and injury. In order to do this, horn players can turn to techniques of vowel production to efficiently manipulate one's oral cavity size for accuracy in changing pitch and refining tone. The relationship of horn and vocal pedagogical techniques with regards to embouchure, mouth shape, and vowel shape using the International Phonetic Alphabet (IPA) are put into practice in the flexibility exercises of the daily routine for horn players.

The third area explored relates directly to the use of the embouchure and vowel shapes while playing the horn. Focus is turned from the vowel to the consonant, providing examples of how to properly use plosive consonants to play the horn free of excess tension. The articulation exercise of the routine allows students to explore how the tip of their tongue moves in relation to the body of their tongue, which creates the vowel shape. Understanding the independent nature of the three parts of the tongue is necessary for a horn player to efficiently articulate and perform music of all styles.

The new routine for horn not only provides a better idea of the relationship of these techniques to horn pedagogy, but also puts these techniques into practice. The connections of these techniques may provide a more efficient physical and technical approach to playing the horn.

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Chapter 1: Introduction

Horn players are confronted with many distinct pedagogical techniques, each offered as the most successful and efficient way to approach the horn. Books about the approach and techniques of well-known pedagogues have many theories and exercises on how to breathe, the best way to perfect embouchure development, performance techniques, and more. For not only horn, but all brass instruments, Farkas focused on what the lips should be doing at the time of sound production, Arnold Jacobs focused on taking a less technical approach to playing and suggested visualization of the ideal sound that is desired, and Raphael Mendez preached the powers of being prepared. However, some of these texts disregard many of the basic needs of the everyday performers, students, and teachers.

Resembling the pedagogues of the mid-twentieth century, contemporary pedagogues have been working to find a better approach to the instrument. Many have written books and daily routines for use with their students, most of which differ in approach and technique to both the early pedagogues and to each other. They are doing this by borrowing techniques from other pedagogies, as well as introducing ideas that focus on the science and understanding of exactly what the body does to create sound. Pedagogues that include Eli Epstein, David Nesmith, Richard Seraphinoff, Jeff Nelson, and more are the authors of some of the most widely used books and routines. Because there is no widely accepted approach to playing the horn, many teachers and performers have to rely on the information gathered through their studies to master the horn.

Many horn students and performers have been told through lessons with private teachers and pedagogical study what to do when playing the horn. However, they have

not necessarily been given the knowledge to understand how the skills can be achieved or why they are being practiced. The constructivist theory of education is a theory that promotes experimentation, curiousity, and active problem solving to build potentially effective habits through engaging with the why of information.[1] Many students know what to do, but not why or how to do it. When asking them why, students are required to engage with knowledge on a deeper level, and with guided discovery, they are able to understand how that knowledge is applicable in their learning. Through engaging with material on this level, the students become not only experts in the subject, but expert-learners, well versed in the skill of how to learn. Teacher's College professor Werner Liepolt writes, "Students do not reinvent the wheel but, rather, attempt to understand how it turns, how it functions. They become engaged by applying their existing knowledge and real-world experience, learning to hypothesize, testing their theories, and ultimately drawing conclusions from their findings."[2]

By using the constructivist theory, teachers can focus on the understanding of the how and why, which can be acquired through many means. One way in which students can learn how their bodies work is to study Body Mapping. Music making requires athletic skill, and athletes need the knowledge of how to use their bodies efficiently. Beyond the knowledge, they also need the training for the practical application of using their bodies in those efficient ways. Bodymap.org defines Body Mapping as "the conscious correcting and refining of one's body map to produce efficient, graceful, and

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[1] "Constructivism as a Paradigm for Teaching and Learning," Concept to Classroom, Last Modified 2004. Accessed October 2016, http://www.thirteen.org/edonline/concept2class/constructivism/.

[2] Ibid.

coordinated movement."[3] One's body map is his or her internal idea of how the body is put together, using a well-informed kinesthetic sense. Body Mapping was first introduced by cellist and teacher William Conable and is an extension of the Alexander Technique, widely used and popular in many of today's music schools. By understanding one's body map and how to properly move, a musician will have the ability to understand how certain muscles, joints, and other parts of the anatomy can affect their techniques. Horn players can turn to several resources to examine Body Mapping more closely. Some of these books can be found in appendix B.

For horn players, Body Mapping can be used to understand the breathing apparatus, something that is essential in the creation of sound and performance of the horn. Once the apparatus is understood, a horn player will be able to explore techniques of how to use his or her air efficiently to reduce excess tension during performance. They can examine how air affects their sound and learn how to regulate that air to fit their specific phrasing needs at any given time. By studying elements of how to regulate the breath, specifically through long tone exercises, horn players and teachers have the ability to better define a more efficient approach to the horn.

Beyond breathing, brass players have often borrowed techniques, music, and texts from other instruments, as many of the modern instruments are only about two hundred years old. Both high and low brass instruments have published books of vocalises used for musical development which horn instructors make use of to improve the technique and musicianship of their students. However, there is not a book of vocalises specifically

[3] David Nesmith, "How Body Mapping.." Accessed September 19, 2016, http://bodymap.org/main/?p=268.

written for the horn. Because of this, there is a gap in knowledge of how these can relate to the full range and capabilities of the horn. By studying elements of vocal technique, specifically vowel production and its effect on the size of the oral cavity, horn players and teachers have the ability to better define a more efficient approach to the horn.

For this project, many of the current pedagogical resources for the horn were examined, as well as resources from other musical areas. A knowledge and study of anatomy and Body Mapping was used to connect ideas of the body's efficient use as it relates to the horn and other pedagogical sources through the scope of performing and teaching the horn. An interview was sent to over two hundred collegiate horn teachers in the United States as well as professional horn players in the country's major orchestras. Their responses, both online and over the phone, were gathered and used as a means for understanding how modern pedagogues engage with the horn, as well as their practice and teaching habits. The interview material can be seen in appendix C.

Through the research presented in this project, the pedagogical techniques based on efficient use of air and vowel and consonant production can easily be seen and implemented in all aspects of the horn by players and teachers who range in skill levels from beginners to accomplished professionals. Using these connections and techniques may provide a more efficient physical and technical approach to playing the horn for performers, teachers, and students. This approach to the horn can be accomplished through studying the routine in this document.

Chapter 2: The Balanced Breath
Section A: The Structures of Breathing

Air is the most important element to playing the horn consistently with a characteristic tone and proper intonation. Many times, when one has a problem while playing, the answer can be boiled down to air, either in its amount or in its use. Understanding one's anatomy and breathing structure can allow the performer to not only have an efficient approach to breathing and using air, but to also have a more efficient and successful approach to playing the horn.

To find the most efficient use of their air, a performer must completely understand the anatomy and body map involved. In his book on breathing for the horn, David Nesmith writes:

> Chemoreceptors in the body register the need for oxygen, triggering an inhalation. The diaphragm contracts downward, the intercostal muscles of the ribs contract moving the ribs up and out, and the spine gathers. The abdominal muscle cylinder expands outward in all directions and the pelvic [floor] moves downward, both yielding to the descending diaphragm.[4]

The following section will explain the previous quote through a basic understanding of the breathing apparatus and its most efficient use.

In her book *How to Learn the Alexander Technique*, Barbara Conable writes that it is important to understand where the breathing equipment in our bodies is located.[5] The lungs take in air to oxygenate the blood. The top of the lungs extend above the collarbones and the bottom of the lungs attach to a muscle called the diaphragm in the thoracic cavity. The bottom of the lungs can be properly mapped by understanding that

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[4] David Nesmith, *The Breathing Book* (Flagstaff, AZ: Mountain Peak Music, 2011), 40.

[5] Conable, *How to Learn the Alexander Technique,* 64.

they lie at about the bottom of the sternum. When one breathes in, the air enters the lungs from the trachea into the bronchial tubes. From the bronchial tubes, the oxygen moves into small tubes called alveoli, whose job is to expand the surface area in the lungs to aid gas exchange. This means, the expelling of CO2 and the absorption of O2 into the blood. This can be seen in an informative video from YouTube user "The Science Channel", and can be seen here at the url, https://www.youtube.com/watch?v=LaOBcF6N7e4.

The first of the major bone structures used in breathing is the spine. The spine does more than holding humans upright; it also provides support for breathing and controlled exhalation. Upon an inhalation, the vertebrae of the spine will gather together, something that with proper alignment can be felt upon taking a breath. Conable writes, "Some of you think you lengthen upon inhalation. No, you widen on inhalation. Some people call it expansion, and the expansion is aided by the gathering of the spine."[6]

Attached to the spine are the ribs, which are quite mobile, contrary to many peoples' body maps due to the term "rib cage". In the back, the ribs are attached by synovial joints to the thoracic section of the spine and are attached to the sternum in the front by cartilage. There are also muscles in between the ribs called the intercostal muscles. These muscles come in two groups. The external intercostal muscles cause the ribs to move up and out during inhalation, while the internal intercostal muscles move the ribs down and in during exhalation.[7] All of these together, the cartilage, the joints, and the muscles allow the ribs a significant amount of movement, especially during breathing.

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[6] Conable, *What every Musician*, 82.

[7] Barbara Conable, *The Structures and Movement of Breathing* (Chicago: GIA Publications, Inc., 2000), 28.

"Each rib swings up and out in relation to the spine as we inhale, and each rib swings down and in as we exhale. This … accounts for what scientists call "excursion" of the ribs…"[8]

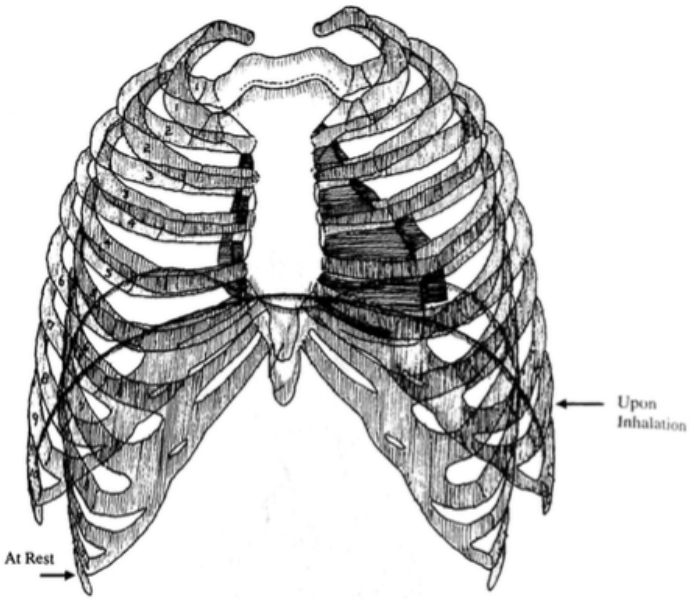

Figure 2.1: Melissa Malde, MaryJean Allen, and Kurt-Alexander Zeller, *What Every Singer Needs to Know About the Body* (San Diego, CA: Plural Publishing Inc., 2012), 66.

There are many muscles involved in the breathing process. The most well known but possibly least understood muscle is the diaphragm, a large thinly walled muscle and tendon that is connected to the lumbar spine and sternum and resides immediately underneath the heart. It is also underneath and connected to the lungs and is above the stomach and remaining viscera. The diaphragm is a domed, but horizontal muscle and bisects the body between the thoracic and abdominal cavities. The diaphragm is a double-dome shape that, upon inhalation flattens out into a single dome that aids in excursion of the ribs and thoracic cavity. In her book, *What Every Singer Needs to Know About the Body*, Melissa Malde writes, "Because of its connections to the surrounding structures,

[8] Conable, *Structure of Breathing*, 28.

the diaphragm's contraction has multiple effects. It exerts downward pressure on the viscera, while pushing the lower ribs up and out. It pulls down on the lungs and massages the heart."[9] This movement can be seen in the above figure.

Barbara Conable describes the diaphragm as being responsible for three quarters of the muscular work of breathing; however, like the heart, it is a muscle that one cannot feel working.[10] "It is impossible to palpate the diaphragm because it domes up inside the ribs. In addition, we have no sensory receptors in the diaphragm so we can't feel its movement directly."[11] Even though the motion of the diaphragm cannot be specifically felt, the consequences of the motion of the diaphragm can be felt in the gathering of the spine, the movement of the ribs, the filling of the lungs, and the movement of the viscera in the abdomen.

The structure that allows air to enter into the body is also important to understand. The air enters into the body through one of two places, the nose or mouth. The air flows into the body through either the nasal pharynx (nose) or the oral pharynx (mouth). The air is then warmed or cooled, filtered, and moistened before entering the laryngeal pharynx. The air then moves through the trachea into the bronchial tubes and into the lungs.[12] Many musicians have heard from teachers to breathe or play with an open throat. In his book about breathing for the horn, David Nesmith explains, "Any restriction or tension in this muscle group will limit free airflow into and out of the body and cause tongue

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[9] Malde, *What Every* Singer, 65.

[10] Conable, *How to Learn Alexander,* 69.

[11] Malde, *What Every Singer,* 66.

[12] Nesmith, The Breathing Book, 22.

tension."[13] It is necessary to be able to relax the jaw, tongue, neck, and pharynx (throat) to allow for maximum efficient air intake.

Humans are able to control the exhalation of their air because of great muscular control in the thoracic and abdominal cavity. The abdominal cavity is surrounded by an impressive muscular structure and is one that is important to understand in order to control air through a quick inhale or controlled exhalation.

Connecting the sternum to the pubis is the linea alba, a fibrous column that vertically bisects the abdominal cavity and helps to connect the muscles together in the anterior side of the body. Humans essentially have four layers of muscle in the abdominal wall, and each works as part of a whole to allow a wide range of motion. These layers from the outside in begin with the external obliques. This muscle group runs from ribs five to twelve down to the linea alba. Directly below the external obliques are the internal obliques which run from the back up to the linea alba. These two large muscle groups' fibers run perpendicular to each other creating strength similar to a mesh bag. Under these two muscles is the rectus abdominis, a long vertical muscle that runs the length of the abdomen. This is roughly the length of the linea alba, which bisects the rectus abdominis. The rectus abdominis is possibly the most well known muscle in the abdominal cavity, as it is responsible for society's desirable "six-pack" abs. The lowest layer of muscle in the abdominal cavity is the transverse abdominis. It begins in the back and runs along the transverse plane, under the rectus abdominis to the linea alba in the middle. The function of the transverse abdominis is to compress the contents of the

[13] Nesmith, The Breathing Book, 22.

abdominal cavity.[14] A picture of these muscles can be seen in figure 2.2, and an informative video on the muscles and their uses can be viewed on the Anatomy Tutorials YouTube channel here at the URL, https://www.youtube.com/watch?v=5Dl5RBTTBRg.

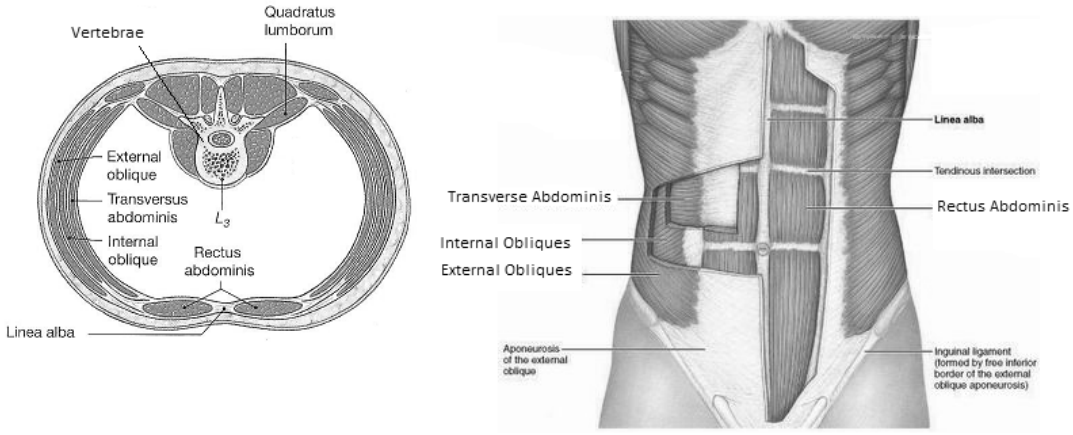

Figure 2.2: "How to Have Tight Abs Forever," Health Club Without Walls, Last Modified April 21, 2012. Accessed April, 2016, http://www.healthclubwithoutwalls.com/2012/04/how-to-have-tight-abs-forever/.

The pelvic floor, below the abdominal cavity, is an important muscular structure in breathing that is affected by the abdominal muscular structure. When the diaphragm flattens out to expand and fill the lungs, the ribs move; this motion is in three dimensions. Because of the three dimensional movement, there is also downward motion. Upon inhalation the abdominal wall expands and the viscera gets pushed down. When this happens there is pressure in the pelvic floor. Conable writes, "[The diaphragm] pushes the viscera downward against the pelvic floor. Just as tension in the abdominal muscles impedes rib and diaphragm excursion, so does tension in the pelvic floor."[15] Figure 2.3 shows the simultaneous motion of both the diaphragm and the pelvic floor.

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[14] Kristina Lisk, "Abdominal Wall," YouTube Video, 6:51, Posted, March 2013, https://www.youtube.com/watch?v=5Dl5RBTTBRg.

[15] Conable, *What Every Musician,* 87.

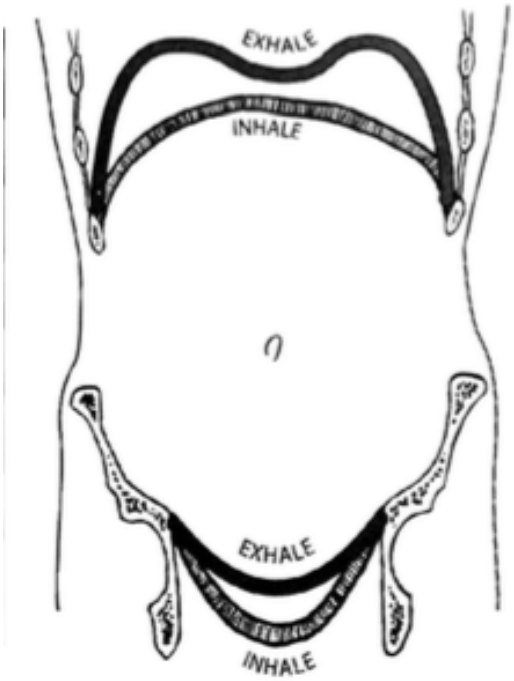

Figure 2.3: Barbara Conable, *What Every Musician Needs to Know About the Body: The Practical Application of Body Mapping to Making Music* (Portland, OR: Andover Press, 2000), 87.

Section B: Finding the Balanced Breath

The most effective way to train performers for the complex physical activity of moving air through the horn is a much-debated topic. There are many schools of thought on the correct way to breathe: from Arnold Jacobs' teachings, to Sam Palafian and Pat Sheridan's *Breathing Gym*, to many horn teachers believing that simply moving air while playing is in itself a breathing exercise.

Arnold Jacobs, a prolific tuba player and brass pedagogue of the Chicago Symphony Orchestra and Northwestern University's Bienen School of Music respectively, had a results-based approach to breathing. Although he studied and used as a teaching tool many books on biology and the breathing apparatus, Arnold Jacobs was

quoted as saying, "Great musicians can be made without the specific knowledge of the body."[16] Brian Frederiksen, Jacobs' former assistant, goes on to explain that Jacobs compared musicians to motorists. "Just as motorists know little or nothing about the mechanics of their car, most musicians know little or nothing about the mechanics of breathing."[17] There is a dichotomy to the teachings of Jacobs; however, his students achieved great results in their performance careers. In a lecture at Indiana University in 1995, Jacobs said, "When I am investigating respiration, I wear an investigator's hat. When I am teaching, I wear a teacher's hat. When I put on the performer's hat, I am not concerned with the mechanics of breathing."[18] Although he appeared to not be concerned with the mechanics of breathing while teaching or performing, Jacobs was known to teach breathing physiology to his students.

The Breathing Gym is a book, DVD, and school of thought for brass players that is aimed at teaching breath support and efficiency, as well as increasing one's air capacity. This system has achieved much popularity among the brass playing community. It has also expanded to other books and videos including *The Brass Gym*, a book designed to give brass players a comprehensive daily routine, and *The Breathing Gym Daily Workouts*, a DVD designed for daily use in ensemble rehearsals. There are 5 types of exercises in the Breathing Gym routine: stretches, flow studies, therapies, strength and flexibility, and breathing for the brain (a technique used to calm and relax the mind). The exercises are generally designed to function in two ways. The first is to increase airflow

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[16] Brian Frederiksen, *Arnold Jacobs: Song and Wind*. Grayslake (IL: Windsong Press Limited, 1996), 99.

[17] Ibid, 99.

[18] Ibid, 196.

and flexibility. These exercises are made up of the stretches, flow studies, and therapies and are designed to teach students to move air at their maximum efficiency. The second main section is designed to increase the amount of air that a performer is able to take and use in a single breath. These exercises can aid the strength and flexibility as well as breathing for relaxation. These exercises are physically more difficult than the airflow exercises, but are considered to expand one's "gas tank", as they often refer to the analogy of a car. A condensed version of the information in the Breathing Gym can be found in a handout from a clinic by trumpeter Brian Shook.[19] The workouts and exercises in the Breathing Gym are thought to not only improve airflow and capacity, but also claim to improve, through those things, one's tone and intonation. Creator Sam Palafian says, "if you pick any of the exercises in the daily workouts the intonation of the group will improve. That's because doing any of these exercises tends to bring out the characteristic tones of the players and bring in the center of their sounds, hence the better intonation."[20] While they are a useful resource for ensemble and personal practice of expanding airflow and air capacity, the Breathing Gym should merely be a resource to use when this practice is needed. Students who only study the Breathing Gym do not acquire a kinesthetic sense of what it means to breathe with a healthy and balanced body map. Because of this, students may have parts of their bodies mismapped and will not be able to attain the maximum benefit of the Breathing Gym exercises. The Breathing Gym

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[19] Brian Shook, "Breathing Gym Clinic," Last Modified June 23, 2010. Accessed May 2016, http://brianshook.com/resources/Breathing-Gym-Clinic.pdf.

[20] Sam Palafian and Patrick Sheridan, "The Breathing Gym: Must See for Band Members," YouTube Video, 10:50, Posted May 28, 2009, https://www.youtube.com/watch?v=qEz0ku-oXM4.

may also be used effectively as a calisthenic exercise, designed to get the performer moving athletically. When the techniques learned through the Breathing Gym are used in every day playing, students may overfill their air, which could lead to prolonged excess tension and even injury. Beyond using only the Breathing Gym, trombone players may turn to David Vining's breathing books, which combine elements of both Body Mapping and Breathing Gym.

Of the many horn performers and teachers interviewed for this document, there are as many different approaches to what it means to do breathing exercises, expand breathing capabilities, or merely just breathe for the purposes of performance. Richard Seraphinoff, one of the horn professors at Indiana University's Jacobs School of Music explains about his approach to breathing for his students in an interview. He says that very seldom will his students do breathing exercises without playing the instrument, "[this] helps them to breathe naturally and fully without thinking too much about breathing as a separate act, but rather as the natural wind up for making sound in any way – vocal or horn."[21] Larry Lowe, the horn professor at Brigham Young University in Provo, Utah shares a similar opinion, "Every piece we play is a breathing exercise... The horn itself provides the resistance and feedback we need."[22]

All teachers and performers do not share this sentiment; many believe that some sort of breath exercise is important to increase airflow and capacity. Eli Epstein, a horn teacher at both the Boston Conservatory and the New England Conservatory uses some

[21] Richard Seraphinoff, Interviewed by Jon Holloway, March 7, 2016, E-mail Interview.

[22] Larry Lowe, Interviewed by Jon Holloway, February 6, 2016, E-mail Interview.

of the elements taught by both Arnold Jacobs and the Breathing Gym; one element in particular is the breathing monitor. The breathing monitor is explained in the Breathing Gym DVD and is a means to understand one's air pressure and support for both the inhalation and exhalation. One uses the monitor as follows, upon inhalation the performer should put his or her right hand vertically against the opening of the mouth, so that the lips are near the knuckle of the index finger, see figure 2.4. Upon exhalation, the performer will move that same hand a distance from the mouth, dependent on the performer, somewhere between 8 and 18 inches, see figure 2.5.

Figure 2.4: Jon Holloway, Model and Photographer

Figure 2.5. Jon Holloway, Model and Photographer

Eli Epstein uses the inhale monitor, but uses a different technique during exhale. He writes:

> I finger-breathe – deep breaths past the fat part of the index finger. I practice how support feels by breathing in deeply and exhaling while making a hissing sound "ssss". I take deep breaths and blow forcefully through the "wrong" end of my mouthpiece. This activates the muscles used in strong support and air flow.[23]

It is clear that teachers from around the country and the world have a different approach to breathing, even if it is a simple one. William Scharnberg, the horn teacher at the University of North Texas's College of Music keeps it very simple. When asked if he or his students participate in breathing exercises, and if so, what do they use, he answered, "Sometimes. Just practice large inhalations."[24]

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[23] Eli Epstein, Interviewed by Jon Holloway, March 11, 2016, E-mail Interview.

[24] William Scharnberg, Interviewed by Jon Holloway, March 31, 2016, E-Mail Interview.

Julie Landsman, a horn professor at the Juilliard School in New York City, takes an approach to breathing that is different than the teachers and performers above. She is a teacher of the Caruso method, developed by prolific brass pedagogue, Carmine Caruso. Caruso was a New York based saxophone player, who had famous students all on brass instruments. His method has been used by many famous players and teachers and revolves around motion. Caruso said, "When playing an instrument, the musician is dealing with numerous body motions. It's the synchronization of these motions that produces the desired results. Synchronization requires perfect timing of all muscular movements."[25] In her lessons, Landsman uses the Caruso method with all of her students. She has adopted his methods of motion for both the body and the airspeed. Landsman says, "The Caruso practice is not musical studies, it's physical studies, physical training."[26] This is similar to the ideas presented in Body Mapping; music is movement. In an interview with Landsman she said:

> You can't make any sound without a motion. If it's a string player, the bow always has to move. I compare the wind players' blow to the bow; it has to move… there always has to be a balance point in the belly, in the gut, of some form of support and is flexible whether it's belly in or belly out, but it's got to be engaged and anchored in fabulous support.[27]

Landsman used Caruso's method of motion in breathing especially; this is apparent with her method that is referred to as the air-driven sound. Air-driven sound is

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[25] "A Tribute to Carmine Caruso," CarmineCaruso.net, Last Modified August 28, 2002. Accessed June, 2016, http://www.carminecaruso.net/.

[26] Julie Landsman, "The Carmine Caruso Method," International Horn Society, Accessed June, 2016, https://www.hornsociety.org/multimedia-mainmenu/caruso-method.

[27] Julie Landsman, Interviewed by Jon Holloway, April 1, 2016, Phone Interview.

put into use by not only feeling the air in the breathing apparatus, but also, much like the air monitor, feeling the air flow through the aperture into the horn. "Carmine worked with airspeed… for dynamics. It's a part of my conversation in just about every single lesson I give."[28] Landsman goes on to explain her ideas of motion and of using the abdominal muscles for support, "Everything comes from the motion of the air and support. You can blow with no support and you can support with no blow, you need both. It's part of an ideal sound, it's not all of it, but that has to be there for basic production."[29]

Horn players can turn to vocal pedagogical practices to understand how to support, phrase, and move air in an efficient, musical way. Vocalists study breathing, as horn players do, because it is important in order to create the most appropriate and resonant phrase. Like horn playing, the breath and consistency of air has the ability to affect the quality of tone, intonation, phrasing, balance, and tension in the body. A problem with the Breathing Gym and many of the breathing exercises previously explained is that they promote the inhalation of excess air, something that can cause excess tension. Excess tension distracts from the proper balance of the body, can create injury, and minimizes the efficiency of breath support. Tension can also force the performer to push the air out, when that is not the most efficient use of the body. One can understand the way the muscles work to relieve this tension. Malde writes, "Breath support is about how the movement of the breath facilitates that sound. If you allow your abdominals and pelvic floor to release and stretch on inhalation, the elastic recoil of these

[28] Julie Landsman, Interviewed by Jon Holloway, April 1, 2016, Phone Interview.

[29] Ibid.

muscles… supports the flow of breath on exhalation."[30] This pedagogical approach to the support of air is something that is generally unknown in brass playing but is advocated by the teachings of Body Mapping on all instruments. Many brass players believe that to achieve proper support and volume, they need to push air and exhale with "power". This can be seen in the Breathing Gym techniques, and many of the exercises require a tense exhale. However, this is incongruent with the natural build and function of the body. As stated above, the natural muscular recoil has the ability to provide enough support to make a characteristic sound. One of Malde's ideas is aimed at singers but can be directly translated to the horn, "If you inhale well, your exhalation will enjoy constant support from the abdominal muscles, the pelvic floor, and the costal cartilage."[31]

Once proper support is created, a singer then learns how to regulate their support. Such support is created by not just releasing the muscles, but also monitoring the release of those muscles to, as Malde says, "shape the exhalation to our artistic needs."[32] In books that explain breathing aimed at vocal performance, taking in only what is necessary for the musical phrase keeps the body free and balanced; this is important for efficiency in movement and efficiency of air. Conable says, "Look at the fact, speech and singing are movement, and most of the movement isn't yours. Most of the movement is the air's."[33] As performers, one acts as a conduit and director of that air and we must use the air in the most efficient way possible. One way to do this is to govern the amount of

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[30] Malde, *What Every Singer*, 87.

[31] Ibid, 87.

[32] Ibid, 87.

[33] Conable, *How to Learn Alexander,* 79.

air that is taken in, and that the amount that is used is the correct amount necessary to perform a phrase. Malde writes, "we will waste valuable energy resisting the pressure of a large inhalation when a small inhalation may have sufficed. Matching the breath we need to the phrase is a skill that singers develop over time."[34] Horn players can take this lesson to their playing in order to minimize the tension created in the body when the massive air is taken in. Horn teacher Richard Seraphinoff says, "I stress that we play the horn theatrically, not conversationally, and the type of breath that one takes to speak theatrically in a large room to project and be heard clearly is the right kind [of breath] to do those same things on the horn."[35] This technique is congruent with the ideas of Body Mapping and the vocalist approach to taking the balanced breath.

When breathing, students should be aware of how easily excess tension can be created in the body. Many teachers have varying ideas of exercises that can be used to build strength and conditioning for breathing. Studying vocal techniques allows students to study how to take a balanced breath, regulating the amount of air for the phrase that follows. Many of the techniques in the Breathing Gym may cause overfilling and excess tension. Even when using these exercises for calisthenics and conditioning they should be practiced thoughtfully. However, with information from Body Mapping techniques in mind, elements of different approaches to breathing can be used to create a more efficient approach to playing the horn.

[34] Malde *What Every Singer,* 86.

[35] Seraphinoff Interview.

Section C: Breathing Exercises for the Balanced Breath

Using maximum air efficiency and awareness of how to regulate the breath is something that can be learned, with practice, by horn players. Something many students and professionals do in their everyday practicing are exercises aimed at controlling breath, whether there is an awareness of the action or not. There are several exercises that are useful for practicing one's breath control and support. The term "flow study" is used in many different contexts. In the Breathing Gym, flow study refers to an exercise that is not on the horn and consists of breathing in different count patterns. However, in this context, the term flow study refers to an exercise or etude on the horn primary meant to aid in shaping a breath to the corresponding phrase, using the air in the most efficient way. They are generally very simple technically and are written in the mid-range. They can range from long-tone, lip slur, or musical exercises, and require awareness of balance and the mapping of breathing. In his book, David Nesmith provides a flow study exercise, and some advice on how to sync the music with the breath. "We seek a gathering of all our resources of body, mind, and intention in balance. In the presence of balance and an adequate, accurate body map, we breathe easy and the music breathes."[36]

[36] Nesmith, *The Breathing Book,* 42.

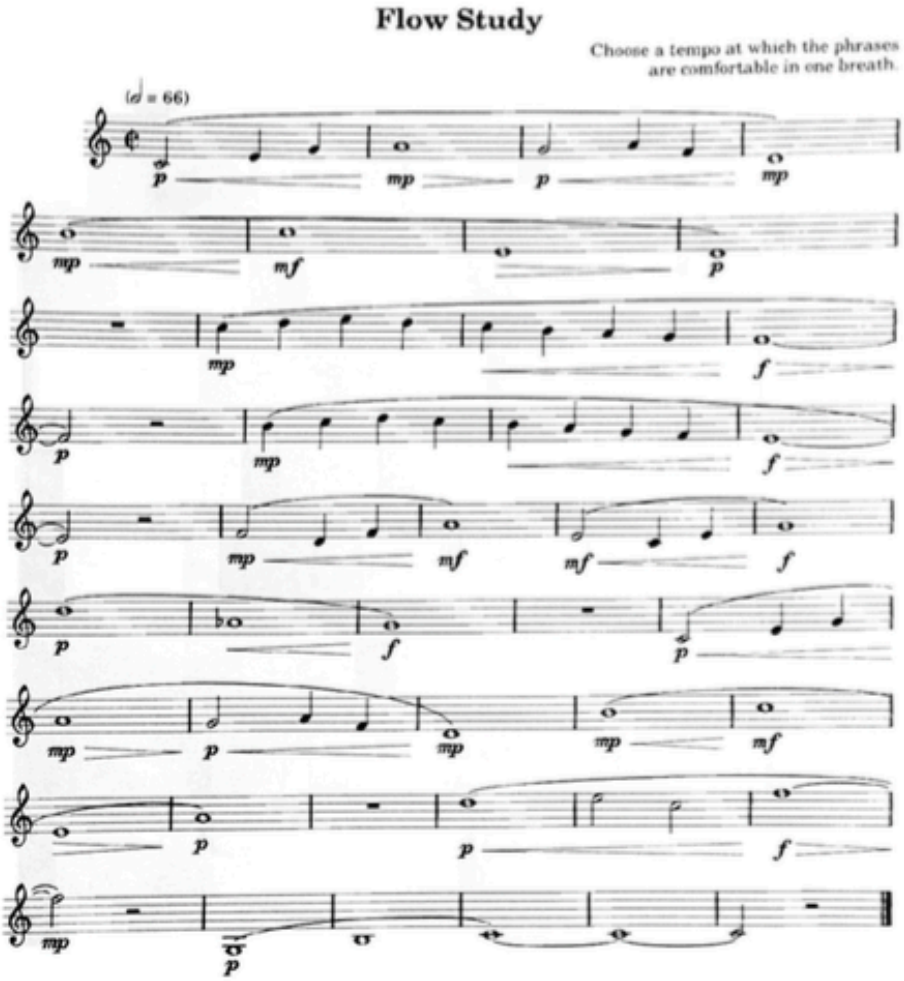

Figure 2.6: David Nesmith, *The Breathing Book* (Flagstaff, AZ: Mountain Peak Music, 2011), 42.

A more musical approach to focusing on one's tone, intonation, and breath is by using an exercise horn players can borrow from vocal pedagogy, called a vocalise. A vocalise is an exercise for the voice that doesn't use a specific vowel sound. Voice teachers have used them for hundreds of years as a means to learn and hone skills for vocalists. Vocalises gained popularity in the 20th century in the brass pedagogy when Johannes Rochut, a trombone player in the Boston Symphony, transcribed some of Giulio Marco Bordogni's vocalises for trombone. Other vocalises that are performed are a set of Giuseppe Concone's that were transcribed for trumpet by John Sawyer. Even though

these have gained much popularity, they have only been transposed for horn. Horn pedagogue John Shoemaker wrote a book of etudes based on the material of the Concone vocalises; however, there is no horn specific book of vocalises in their original form.

Even though they are non-horn-specific, teachers such as Larry Lowe, William Scharnberg, Eli Epstein, and more use both the Bordogni and Concone vocalises with their students. In an interview with Epstein, he said, "I find that [Concone and Bordogni vocalises] provide melodies that are very easily sung and therefore easily transferred to singing as one plays."[37] In the Kalmus edition of Bordogni vocalises, Th. Baker praises the skills learned for singers by learning these vocalises, "They not only promote rapid and even technical development, but are, in their way, models of pure vocal style, especially on the side of clean and elegant phrasing."[38] These ideas can be directly translated to playing the horn as horn players can learn a lot about not only breath control and musicianship, but the technical development and vocal style to which Baker was referring. Most popular among horn players are the Concone, and they can be a part of any horn player's daily practice as a supplement to help learn about the natural balance of one's breath control and support.

Section D: The Routine's Long Tones

A daily routine was created that puts the information from this document into practice. The routine has exercises in three main areas: long tones, flexibilities, and articulation studies. This routine can be used by students, teachers, and professional horn

[37] Epstein, Interview.

[38] Giulio Bordogni, *36 Vocalises for Mezzo-Soprano or Baritone,* Forward, Thomas Baker (Melville, NY: Belwin Mills Publishing Corp., 1900),

players and was created to allow horn players to approach the horn in a more efficient way by understanding the use of their body's natural structure and movements. When used properly, the routine can teach students to play without excess tension, and allows for improvement in their tone, intonation, articulation, range, musicality, phrasing, and much more.

Exercises for perfecting one's efficient use of air, even simpler musically than both flow studies and vocalises, are long tones. Long tones are practiced in many different ways, depending on the needs of the specific performer. A well-known long tone exercise was created and made famous by Emory Remington, a trombonist and teacher from the Eastman School of Music in upstate New York. This exercise consists of a chromatic ascending or descending line through the valve combinations, returning to the tonic in between. Many teachers have adopted these exercises as they are simple in technique and allow for the refinement of tone, intonation, and breath support. The first part of Jon Holloway's routine for horn players uses a horn-specific Remington-style exercise to practice breath regulation and support while consequently improving tone and intonation.

The following long tone exercise is designed for horn players, and is ideally played as one of the first things he or she plays on any given day. This exercise is written in eight-count phrases on a variety of ranges in the horn from very low to very high. This allows the performer to work on regulating the air to shape the phrase to their artistic needs among those different ranges. Along with breath regulation, the long tone exercise will also function as practice for tone, intonation, and steady tempo. The exercise should be played with both a drone and metronome and each eight-count phrase should be

played in one relaxed breath. The goal for the performer is to play the phrase to the end without an excess surplus of air, which can cause excess tension in the breathing apparatus, chest, neck, and jaw, potentially creating difficulty in the next phrase. During the exercise, the student should be monitoring the 'down and in' motion of the ribs, to help regulate exhalation. Some excess air may not be detrimental, as there is time between phrases to relax before taking the next breath in. Ideally, the student should be focusing on the regulation of air and its relationship to maintaining a beautiful sound and consistent intonation. An excerpt of the exercise can be seen in figure 2.7.

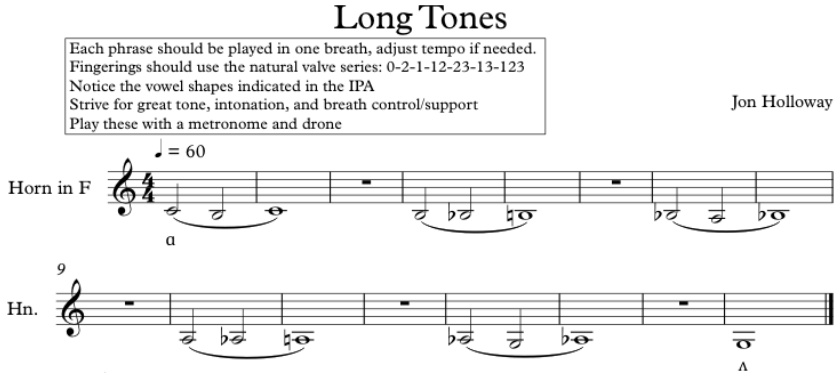

Figure 2.7: Jon Holloway, *Daily Warm-Up Routine*.

The purpose of using the metronome and drone in the exercise is to allow the performer to be exposed to a consistent tempo and pitch with which they should strive to match. In the routine, this exercise is played on a variety of partials, providing practice of intonation, tone, and phrase shape on the entire range of the horn. When comparing this long tone exercise to other breathing exercises including flow studies, vocalises, or exercises in the Breathing Gym, this exercise is simple and easy to master, allowing the performer to focus on the primary tasks for which this exercise was designed. However, the performer may supplement some of those exercises for work with longer phrases in flow studies and vocalises.

Chapter 3: The Vowels
Section A: The Embouchure

The embouchure for a horn player is the muscular structure surrounding the aperture, where the lips vibrate to create sound. What is defined as part of the embouchure itself is an idea that has been debated and refined over time. In early horn pedagogy, Philip Farkas defines the embouchure as "the setting of the lip and face muscles in a position which will enable them to vibrate at varying speeds and intensities when the lips are blown through."[39] However, more recently the entire makeup of the facial structure has been broken down to two parts, the embouchure and the aperture, which allows for less movement and strain of the facial muscles as a whole. In *Horn Playing from the Inside Out,* Eli Epstein writes, "Embouchure refers to how we set our lips on the mouthpiece and how we use our facial muscles to control air speed by changing the size, shape, and quality of the aperture."[40]

The embouchure is made up of many small muscles connected to the lips, mandible, skull, and neck that work together; however, a horn player must direct his or her attention to only several of those muscles to make the most efficient use of the embouchure. The first pair of significant embouchure muscles are the pair of muscles that act to close the lips. The first of these is the orbicularis oris, a muscle that, while not connected to a skeletal structure, is one of the most often-used muscles in the formation of the embouchure. The fibers of the orbicularis oris are in two groups, an upper and a

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[39] Phillip Farkas, *The Art of French Horn Playing* (Evanston, Ill.: Summy-Birchard, 1956), 19.

[40] Eli Epstein, *Horn Playing from the Inside Out: A Method for All Brass Musicians (*Brookline, MA: Eli Epstein Productions, 2012), 9.

lower that cross at the corners of the mouth.[41] The lines of the orbicularis can be seen in figure 3.1.

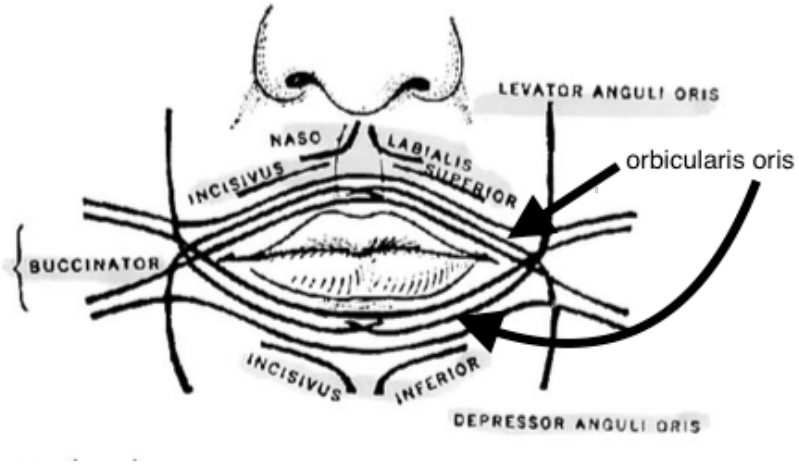

Figure 3.1: Lawrence Fried, *Anatomy of the Head, Neck, Face, and Jaws* (Philadelphia, PA: Lea & Febiger, 1980), 65.

The other muscles involved in the closing of the lips are the incisive muscles and can be seen in figure 3.1. The incisive muscles are very small and work closely with the orbicularis. They are connected to the canine eminence on top and the mandibular canine eminence on the bottom. The canine eminence is an elevation of bone at the root of the canine, or cuspids. These muscles, along with the orbicularis oris not only close the lips, but also are responsible for pursing the lips; they are colloquially known as the "kissing muscles."[42]

The other pair of muscles necessary for a student to understand are the risorius and the buccinator muscles. The risorius is a muscle at the corners of the mouth, and is

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[41] Larwence Fried, *Anatomy of the Head, Neck, Face, and Jaws* (Philadelphia, PA: Lea & Febiger, 1980), 65-6.

[42] Fried, *Anatomy,* 66.

connected to the masseter muscle. This muscle functions in pulling the corners of the lip laterally, and is known as the smiling or 'smiley muscle'.[43]

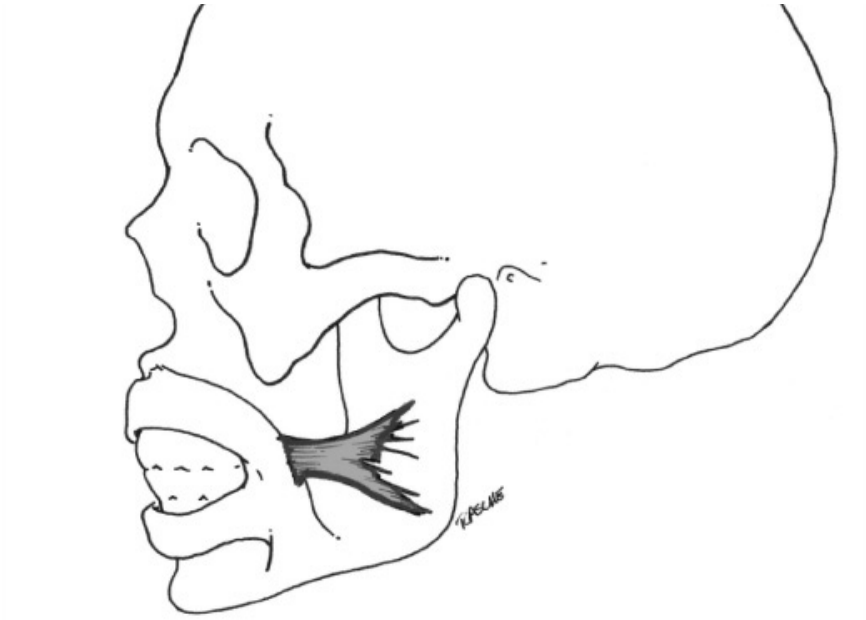

Figure 3.2: "Risorius Muscle, Medical Gross Anatomy" University of Michigan Medical School, Accessed October, 2016, http://www.med.umich.edu/lrc/coursepages/m1/anatomy2010/html/ anatomytables/muscles_alpha.html.

The buccinator muscles, like the risorius, are connected to the corners of the mouth. However, these muscles are thin, wide, and flat and are responsible for the substance and firmness in the cheeks. In his book on facial anatomy, Lawrence Fried writes, "The main function of the buccinator is to keep the cheek in tone. This prevents biting the mobile and adaptive cheek."[44] The muscle also aids in keeping food on the surface of the teeth, which aids in chewing as well.[45]

[43] Fried, *Anatomy*, 71.

[44] Ibid, 73.

[45] Ibid, 73.

Section B: Changing the Pitch

It is the balance of the two main muscle groups that make for a well formed, relaxed, and efficient embouchure. Traditionally, the idea of the balanced embouchure was not the most popular. Many leading brass and horn pedagogues have written in favor of an embouchure where the lips control the pitch of the instrument. Lips are often thought of as the thin layer of skin surrounding the mouth on which one could apply lipstick; Body Mapping scholars refer to this as the lipstick lips.[46] However, the lip muscles extend further into the skull and mandible and can be seen in figure 2.1. The theory is that when the lips vibrate faster, the pitch will raise. This is achieved through increasing the tension of the muscles on the lips to increase the speed of vibration. This is mentioned for general brass players in Raphael Mendez's book on the beginning stages of brass playing. He writes, "It is for the lips, aided by our ear, to regulate and control the rate of vibrations necessary to produce the note or notes desired."[47] Mendez was not the only pedagogue to share that sentiment. In his book *The Art of French Horn Playing*, Philip Farkas explains his take on the embouchure: "Now in order to get a higher note we need more rapid vibration. To do this we tighten these muscles still more. This permits even less stretch, thus requiring the lips to snap back together sooner, making the vibrations faster – higher in pitch."[48] Using only the lipstick lips to control the pitch creates a strain on the muscles of the embouchure, leading to fatigue sooner than is necessary. Recently, the definition of the embouchure has expanded from just the lipstick lips, to the entire musculature involved with producing the actual vibration.

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[46] Malde, *What Every Singer,* 147.

[47] Rafael Méndez, *Prelude to Brass Playing* (Boston: C. Fischer,1961), 18.

Some of the more popular modern approaches to understand the embouchure use the balance of the two groups of muscles differently than past pedagogues. The risorius and buccinator, or "smile" muscles, are responsible for providing the strength and firmness of the embouchure; they act upon the other group by pulling the lips back to allow vibration. The other group, the orbicularis and incisive, or "kissing" muscles", are responsible for providing a relaxed, semi-closed lip surface to allow the lips to vibrate freely. Using the muscles in this way make the volume and support of air more important because the airspeed is responsible for the speed of the vibration.

Once the mechanics of the muscles in the embouchure are understood, the player can begin to consider the vibrating surface that creates sound. When the embouchure is formed, the lips are close together and, when blown through, create a vibration, or "buzz". This buzz, when manipulated, can vary a great deal in pitch. The vibrating lips are similar to a reed on a woodwind instrument, the head of a drum, or the vocal folds in a vocalist. The lips are similar to the vocal folds in that when air is expelled through the opening, both the lips and the vocal folds vibrate, creating sound. In order to change pitch, the muscles of the larynx change the tension of the cords; however, if a horn player were to use the embouchure muscles alone to manipulate the tension of the lips for every pitch, he or she would tire very quickly. Because of this, horn players use other techniques to increase efficiency and stamina. Eli Epstein explains that there are more factors necessary for maintaining and increasing endurance. He writes, "When one or

[48] Farkas, *Art of Horn Playing,* 19.

more of these components is missing, the embouchure and facial muscles become overtaxed, draining our stamina and compromising the quality of our sound."[49]

Because of the strain created on the muscles of the embouchure when the lips are used exclusively to change pitch, it is necessary to find a more efficient approach to this problem. When approaching the mouthpiece, the aperture of the lips can be thought of as the reed on a clarinet; a vibrating application that does not change, but is affected by several factors behind it. The buzzing of the lips is a horn player's reed. A performer's risorius or "smiling muscles" should remain firm, while the point of vibration on the lips' aperture should be relaxed and supple, allowing for a free vibration. Striving for less motion in the facial muscles and less tension on the aperture during playing can also increase a horn player's flexibility throughout the full range of the horn. Epstein writes, "The mouthpiece rim should remain in the same position on the lips in all registers, which leaves the upper lip free to vibrate and allows flexibility between registers."[50] Understanding where to place the mouthpiece is also an important factor for a horn player. A general rule is that the mouthpiece should sit in the center of the lips, one third on the bottom and the other two thirds on the top lip. This will allow the freedom of the upper lip vibration to which Epstein was referring. For an example, see figure 3.3.

[49] Epstein, *Horn Playing, 15*.

[50] Ibid, 10.

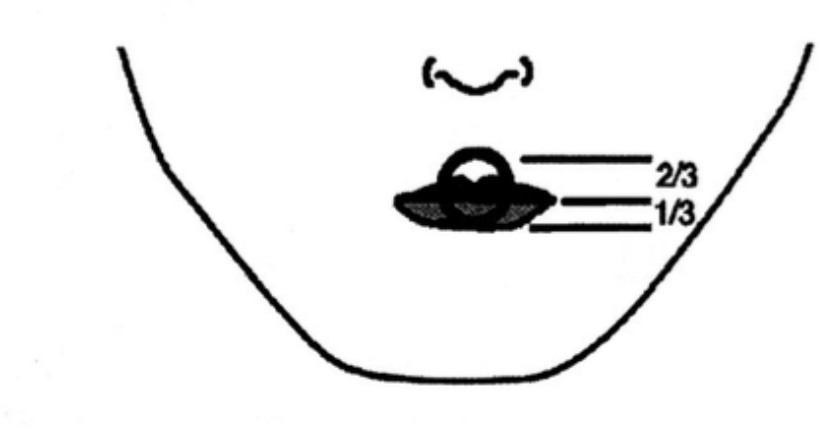

Figure 3.3: Eli Epstein, *Horn Playing from the Inside Out: A Method for All Brass Musicians (*Brookline, MA: Eli Epstein Productions, 2012), 9.

With a proper understanding of the breathing apparatus and how to set the embouchure for a tension-free vibration, a horn player can begin to understand how to use these two skills in conjunction to manipulate pitch, tone, intonation, and many other things needed to become an accomplished performer. David Nesmith explains the embouchure in this way. "Our embouchure is a dynamic shape of mobile soft tissue that directs airflow in a smooth transition from our body to the horn, as the mouth of a river is a smooth transition of water flowing into the sea."[51] Many contemporary pedagogues rely on air as the base requirement of all skills on the horn. Many teachers, from Julie Landsman to Eli Epstein use air as a means for more than just creating sound. Eli Epstein writes, "The more we use flowing air and breath support, and the better we control air speed by using the parts of our bodies that don't get as tired as the facial muscles, the less we actually need to use our facial muscles."[52] With this information, a horn player can

[51] Nesmith, *Breathing Book,* 18.

[52] Epstein, *Horn Playing,* 14.

begin to rely on his or her embouchure as being a somewhat dynamic, somewhat set apparatus that is partially responsible for the creation and manipulation of pitch and sound. The other, much more important factor in this is the use of air.

When asked how to change pitch beyond the use of the tightening or loosening of the lips, performers will often turn to airspeed and pressure. They believe that by pushing with the abdominal muscles, the air will move faster, thus producing a faster vibration, and higher pitch. However, when asked to demonstrate this, many have a difficult time changing the pitch this way whilst achieving a constant characteristic tone. Horn players often use their air pressure for shaping an articulation or changing a color, and as concluded in the section on breathing efficiently, should rely mainly on the natural recoil of their muscles to provide that airspeed and pressure needed for normal playing of the horn.

When changing the airspeed and pressure with the abdominal muscles, the horn will often respond with a bumpy transition note to note, something that is not desirable in performance. Because of these reasons, relying on the constant changing of airspeed and pressure with the breathing apparatus will diminish the tone and quality of performance from a performer, and should not be used as the main means for changing pitch.

Airspeed is something that brass pedagogues such as Farkas, Jacobs, and Méndez, did not often talk about as something that is ever-changing. However, airspeed should generally remain a constant from the breathing apparatus and is responsible for maintaining a constant and consistent quality of tone on the horn. In an interview, Julie Landsman says, [airspeed] is part of an ideal sound, it's not all of it, but that has to be

there for basic production."[53] While a constant airspeed from the breathing apparatus is helpful in tone production, a dynamic airspeed through the aperture is required to create and manipulate pitch and volume. Landsman also says, "Airspeed for tone and airspeed for dynamics. It's a part of my conversation in just about every single lesson I give."[54] Through this, it is implied that while airspeed is necessary for sound creation, it is also dynamic and able to change in order to vary not only volume, but other aspects of playing the horn as well.

Consider blowing into a bottle. When one blows into a bottle, that air goes into the bottle and builds pressure. That pressure builds and the air is pushed out. When the air is both moving in and out of the bottle, a vibration is created. If the bottle is empty, the pitch produced will sound lower than a bottle that is half-full. This is caused by the elasticity of the air in relationship to the amount of liquid in the bottle. When the air has less space to vibrate, the vibrations have less space to travel, causing a faster vibration. This is also the case in woodwind instruments like the clarinet. At a basic level, the air in the instrument remains constant, as does the vibration of the reed to the mouthpiece. When the clarinet plays a 'low g', all fingers (except the pinkies) are down, creating a longer air column. When playing the g above middle c, only the right thumb is pressed down, causing the instrument to sound an octave higher. When a pitch increases by an octave, the vibrations are traveling twice as fast. This is caused by the amount of space that is inside of the instrument. But instead of liquid in a bottle, the fingers covering the holes decide the size of the column of air inside the clarinet.

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[53] Landsman, Interview.

[54] Ibid.

Although horn players can change the length of the instrument to influence pitch by using valves, there are no more than seven options in any given partial. Horns, like all brass instruments have partials, a system of pitches in the harmonic series that occur naturally on the horn and are created by introducing faster vibrations into the instrument itself at mathematical intervals. As the pitch increases, the space between partials decreases. The fundamental of the horn is two octaves below middle c. This makes accuracy of partial difficult on the horn because the notes are closer together. Because of this, horn players spend lifetimes attempting to perfect the skill of being able to play a specific pitch consistently and accurately. It is also the closeness of the partials that, when using the embouchure to change pitch, creates such strain on the muscles themselves. This creates a need for a more efficient approach to the horn aimed at both reducing muscle strain and the margin of error when attempting to accurately play notes in different partials.

When the teachers like Farkas, Jacobs, and Méndez write about using the lips to change pitch, they are coming to a simple conclusion; faster vibrations will create a higher pitch. This conclusion is quite logical; however, because of the inefficiencies created in this technique, new ideas about how to increase stamina and accuracy have come to the forefront in recent years. These new ideas effectively use the air, in conjunction with the inside of the mouth and the embouchure, to change pitch. A very popular analogy among teachers is to compare the air with a garden hose. When one places his or her thumb on the opening of the hose, the water moves faster and goes further. This is indicative of air passing through the oral cavity, through the vibration of the lips, and into the horn. Eli Epstein writes about this in his book, "it helps to imagine

the spray nozzle on a garden hose, which can be adjusted to make the water flow at different speeds by changing the size of the opening. The smaller the opening, the faster and more focused the water stream."[55] There are similarities to this when playing the horn. The space inside the cavity of the mouth is able to vary to allow for a change in air pressure and air speed to achieve variation in pitch, tone, and volume.

There are many different ways to change the size of the inside of the mouth, or oral cavity. The first major technique is to move the jaw. The jaw has a natural position, which is relaxed and slightly open; this position happens when one says the word cut. Often, the jaw will move as a consequence of natural muscular recoil and gravity; when the jaw is lower, the oral cavity is larger. Changing the size of the oral cavity will force the air through the cavity of the mouth at different speeds, creating different pitches. Horn pedagogue Eli Epstein refers to these jaw positions as 'elevators', and they vary in height for each partial and pitch. Epstein is in favor of using these elevators in conjunction with slight changes in lip tension and vowel shape. He says, "I've learned through experience that we also need to have subtle gradations of jaw position to finely tune oral-cavity size and further control the air speed coming out through the aperture."[56] In order to change the oral cavity size, a horn player needs to understand that movement of the jaw is inevitable. It is necessary for the space inside of the oral cavity to have a dynamic range from very open to quite closed. While these elevators can allow for efficient pitch change, they can also create mechanical movement of the jaw in young players. This can be remedied by using jaw positions subtly and in conjunction with other

[55] Epstein, *Horn Playing,* 9.

[56] Ibid, 27.

factors to create a more smooth transition between the elevators. Epstein says, "By subtly directing our lower jaw position… we can gain greater flexibility, improved accuracy and endurance, and more clarity and focus in all registers."[57]

Another way to change the size of the oral cavity beyond the use of the jaw position is to change the shape of the inside of the mouth. This can be done by manipulating a very large and powerful group of muscles within the mouth known as the tongue. The tongue is made up of three sections and 8 muscles. For a proper understanding of the tongue for playing horn, students need to be most familiar with two of the three sections, the body and the apex (or tip). These are connected to the body by the third section of the tongue, the root (or base), which is connected to and supported by the hyoid bone. With a proper body map of the tongue, a horn player will be able to freely and simultaneously use it to both manipulate oral cavity size and properly use the tip for articulation. The three sections of the tongue can be seen in figure 3.4.

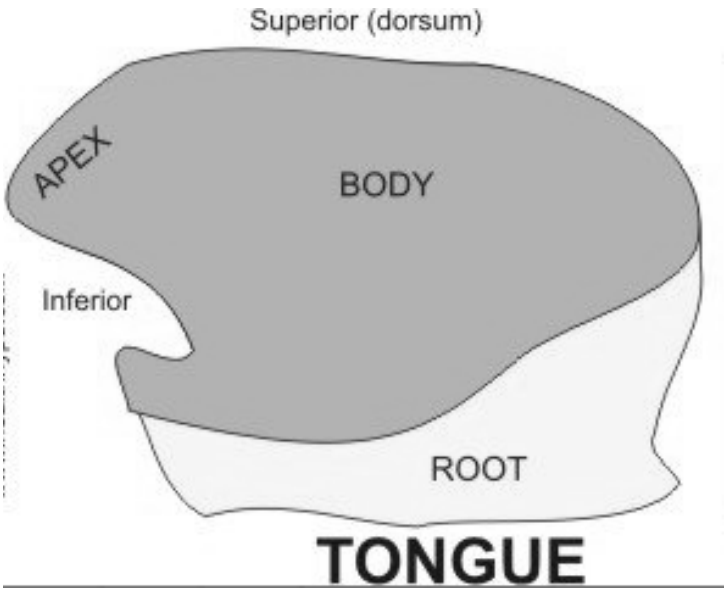

Figure 3.4: Dr. Chris, "Anatomy, Parts, Pictures, Diagram of Human Tongue," HealthHype.com, Accessed June 2016, http://www.healthhype.com/tongue-anatomy-parts-pictures-diagram-of-human-tongue.html#prettyPhoto.

[57] Epstein, *Horn Playing*, 27.

The body of the tongue can raise and lower in both the front of the mouth and the back. When doing so, the oral cavity changes. When the tongue is in a natural, relaxed position, the base rests at the area of the mouth where the teeth meet. The tongue can easily move lower and higher in the mouth, changing the size of the oral cavity. This change is very similar to the jaw elevators in that there is a wide possibility of minute differences in the shape and size of the oral cavity, allowing for a multitude of airspeeds. Consider the analogy of the hose. By putting a finger over the end of the hose, the water will flow out of the aperture faster, and consequently further. The same is true with of the tongue shape inside of the mouth. The higher and further forward the tongue is, the faster the air will rush out of the aperture and into the horn. This will cause the lips to vibrate faster and will provide a higher pitch. This technique can be witnessed without a mouthpiece by whistling. When one whistles a simple siren without a consciousness of what the tongue is doing then turns their kinesthetic sense to the tongue, they will find that while the tip of the tongue stays relatively still, the body of the tongue is moving with the changing of the pitch.

Through the study of the four main ways to change pitch that include lip tension, air speed and pressure, jaw movement, and tongue movement, a logical conclusion can be made that in order to be the most efficient player, one must use these elements together in order to change the pitch with an emphasis on the dynamic oral cavity. It can be seen that changing the oral cavity will have an effect on the speed of the vibration and because of both that, and the fatigue created by using the embouchure muscles alone to change pitch, the use of a dynamic oral cavity allows for the most efficient approach to playing the horn.

Once efficient breathing and the embouchure is understood, a student can properly comprehend three main rules for creating the pitch. These rules are that the smiling muscles must be engaged, the point of contact (or kissing muscles) must be relaxed and able to vibrate, and the airspeed and pressure from the body should remain constant. While these rules work for most of the range of the horn, there will be some variation for very extreme range and dynamic changes. However, in order to use the idea of the dynamic oral cavity, students must be able to master the skill of changing the shape of the inside of their mouths.

Section C: Choosing Vowels

In order to master and become experts of the dynamic oral cavity, performers need to understand how and why it works. Although writing about the idea of using the oral cavity to change pitch is somewhat new in pedagogical texts, through study, one will find that many horn teachers and performers already use a dynamic oral cavity in their pursuit of playing the horn. Studies that show the effects of using the jaw and tongue in conjunction to change the pitch of the horn can be found and show many well-known horn players using both the jaw and tongue to manipulate their pitch.

Dr. Peter Iltis, professor of Kinesiology at Gordon College in Wenham, Massachusetts has conducted extensive studies on the effects of an injury called focal dystonia on musicians, and more specifically horn players. Focal dystonia is a neurological condition that causes involuntary motion or decreased voluntary motion in a specific muscle group. This injury is career threatening and has the potential to have life-long effects. Although the effects of these injuries are not being studied here, Dr. Iltis'

work with healthy and elite horn players shows the success of the ideas of using the jaw and tongue to aid in changing pitch efficiently on the horn.

His most recent study, *Inefficiencies in Motor Strategies of Horn Players With Embouchure Dystonia: Comparisons to Elite Performers* focuses on the shape and movement within the oral cavity during descending and ascending harmonic series using a specific exercise, which can be seen in figure 3.5. He did this by sending twelve elite horn players and five horn players with dystonia into an MRI machine to record the movements during the exercise.

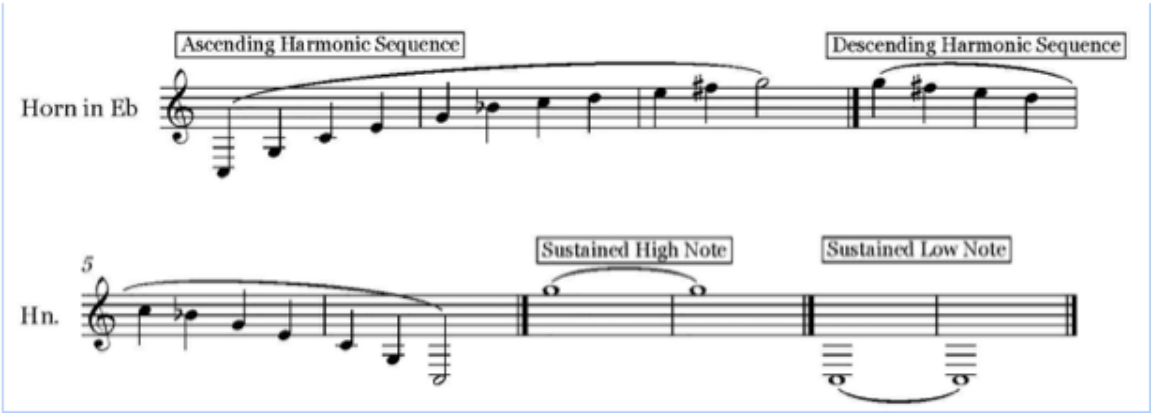

Figure 3.5: Peter Iltis, Jens Frahm, Dirk Voit, Arun Joseph, Rachel Burke, and Eckart Altenmüller, "Inefficiencies in Motor Strategies of Horn Players with Embouchure Dystonia: Comparisons to Elite Performers," Unpublished Journal Article, Accessed May, 2016, 6.

The horn was built to be compatible in an MRI machine by Indiana University professor Richard Seraphinoff. The horn, which was non-ferromagnetic and pitched in Eb, was "placed at the feet of the subject, and a length of graduated plastic tubing, terminating in a plastic mouthpiece, extended to the head of the subject within the MRI scanner."[58] This horn, although not a perfect representation of a real horn, allowed the

[58] Peter Iltis, Jens Frahm, Dirk Voit, Arun Joseph, Rachel Burke, and Eckart Altenmüller, "Inefficiencies in Motor Strategies of Horn Players with Embouchure

instrument to be played inside of the MRI machine. Iltis wrote, "The range of the instrument spanned a three-octave sequence of 15 notes, but for this study the top four harmonics were not included, as they proved too difficult for the dystonic horn players to produce."[59] A picture of Mr. Seraphinoff's horn can be seen in figure 3.6.

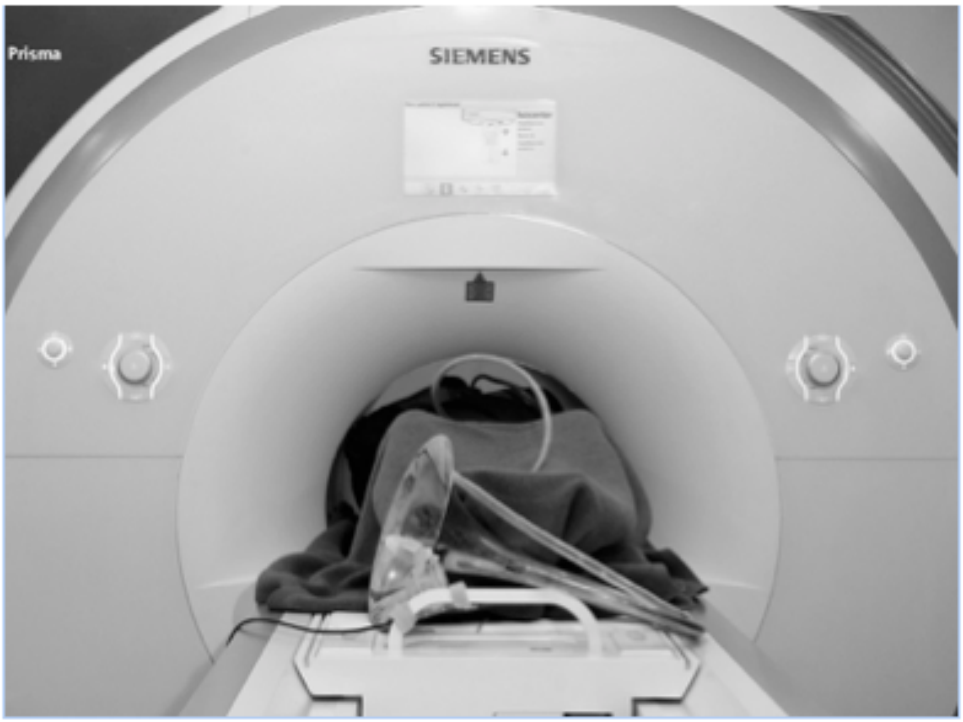

Figure 3.6: Peter Iltis, Jens Frahm, Dirk Voit, Arun Joseph, Rachel Burke, and Eckart Altenmüller, "Inefficiencies in Motor Strategies of Horn Players with Embouchure Dystonia: Comparisons to Elite Performers," Unpublished Journal Article, Accessed May, 2016, 5.

During the two main exercises, the ascending and descending sequences, results were collected and similarities were found among the elite horn players. He found that while jaw movement and tongue movement often work together, there is a point in which the jaw remains relatively still. He writes: "The elite horn players show a progressive

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Dystonia: Comparisons to Elite Performers," Unpublished Journal Article, Accessed May, 2016, 4.

[59] Iltis, *Inefficiencies,* 5.

elevation of the jaw moving from Eb2 to Db4, with little change occurring on subsequent notes."[60] Figure 3.7 shows the mean jaw movement of the elite horn players during the ascending harmonic series. It can be seen that after Db4, the motion of the jaw greatly decreases. During the descending harmonics, a similar motion is true. In figure 3.8 it can be seen that the major motion of the jaw occurs once the player has reached Db4. Once he or she moves downward, the jaw motion increases greatly.

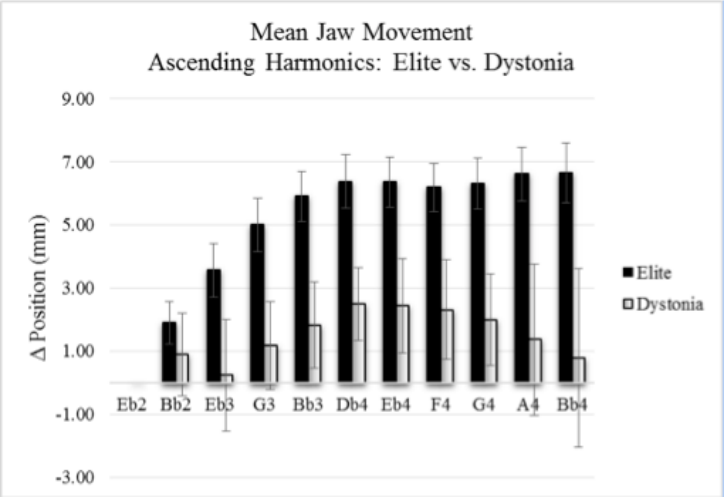

Figure 3.7: Peter Iltis, Jens Frahm, Dirk Voit, Arun Joseph, Rachel Burke, and Eckart Altenmüller, "Inefficiencies in Motor Strategies of Horn Players with Embouchure Dystonia: Comparisons to Elite Performers," Unpublished Journal Article, Accessed May, 2016, 11.

[60] Iltis, *Inefficiencies*, 10.

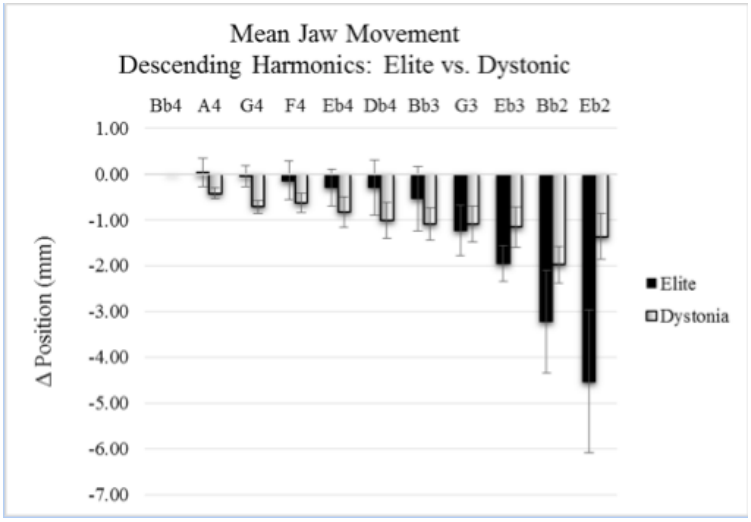

Figure 3.8: Peter Iltis, Jens Frahm, Dirk Voit, Arun Joseph, Rachel Burke, and Eckart Altenmüller, "Inefficiencies in Motor Strategies of Horn Players with Embouchure Dystonia: Comparisons to Elite Performers," Unpublished Journal Article, Accessed May, 2016, 13.

This is caused by several factors. While descending, the distance between each pitch increases as the performer plays the exercise. Logically there will be less motion when the interval is a major second in comparison to a perfect fourth, fifth, or octave. When the notes become closer together, the movement of the jaw becomes too large and cumbersome to create finite motions to increase the oral cavity size. In order to better fine-tune the size of the inside of the mouth, the elite horn players turn to using the elevation of the tongue. In figure 2.9 the tongue movement is measured over the same harmonic series. It is clear that the tongue, during the larger intervallic leaps, works with the jaw; but during the smaller changes of a second or less, above Db4, the tongue continues its motion. Iltis writes: "Our data show that this elevation only takes place during transitions between the first 5 harmonics, and that subsequent to that point, further reduction of the oral cavity space is completely accomplished by the tongue."[61]

[61] Iltis, *Inefficiencies,* 15.

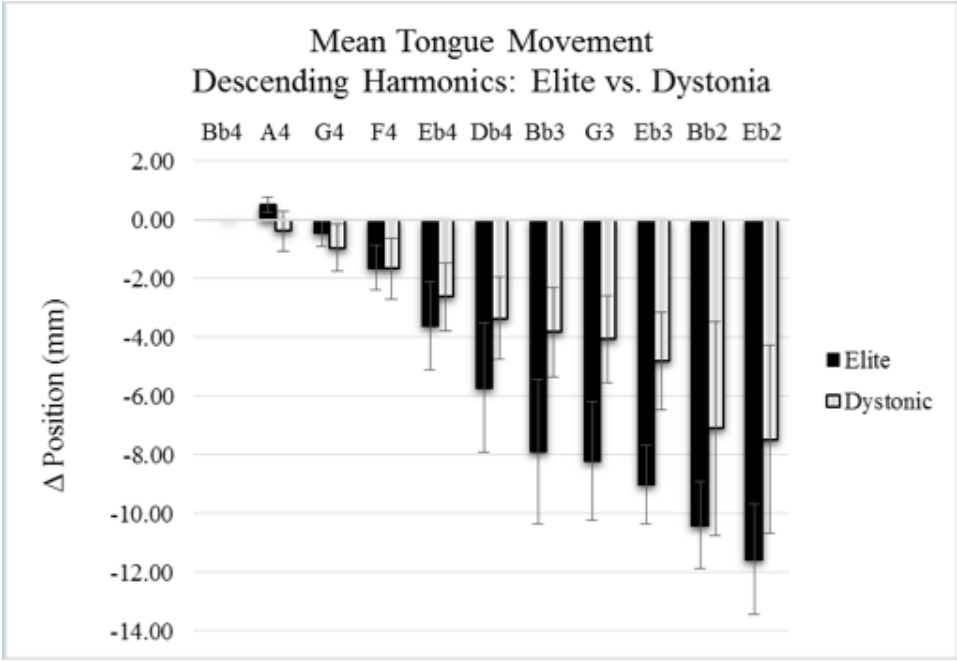

Figure 3.9: Peter Iltis, Jens Frahm, Dirk Voit, Arun Joseph, Rachel Burke, and Eckart Altenmüller, "Inefficiencies in Motor Strategies of Horn Players with Embouchure Dystonia: Comparisons to Elite Performers," Unpublished Journal Article, Accessed May, 2016, 12.

Iltis finds that "in transitioning from high notes to low notes… it is logical to assume that the cross-sectional area of the passage will increase, as a decrease in air flow velocity would allow for lower vibration frequencies of the lips."[62] This is a direct correlation to the analogy of the hose, when the size of the opening increases, the speed of the water will decrease. In his conclusion, Iltis writes: "It is apparent that elite players employ vertical movement strategies of both the tongue and jaw that systematically decrease the size of the airway for ascending notes and increase its caliber for descending notes."[63] He addresses the movement of the tongue for more minute space between notes

[62] Iltis, *Inefficiencies*, 17.

[63] Ibid, 20.

and goes on to suggest "that manipulation of the tongue to channel the air through a narrower passageway over its dorsal surface for higher notes is also used by elite horn players."[64]

Some of the results of this study can be seen in a YouTube video placed online by Sarah Willis, a horn player in the Berlin Philharmonic. In a video as part of her YouTube channel, Willis calls this video "(MRI) Chamber Music with Sarah Willis," and can be found at the URL: https://www.youtube.com/watch?v=MWcOwgWsPHA. When watching this video, both exercises five and six show how the oral cavity works to help manipulate pitch. Willis moves both her tongue and jaw together, as the graphs of the findings indicate. These findings were congruent of the rest of the elite horn playing group, which included Eli Epstein, Sarah Willis, Jeff Nelson, and nine other prominent American, and European horn players.

The elevators and the movement of the tongue can be used as a technique to change pitch on the horn. With his or her kinesthetic sense, a performer can learn which tongue positions correspond with each particular pitch, and learn, through repetition, how to quickly arrive at those positions for an increased accuracy on the horn. However, the problem that arises with using this technique is similar to that of using just the elevators to change the oral cavity. The necessary minute changes in the tongue, while simple to master, are somewhat mechanical in nature. When one relies on one technique alone to change pitch, that muscle group will tire quickly, especially if that motion is often small and mechanical as are the tongue and jaw positions. When used as the sole technique for changes in pitch, these movements can become cumbersome and inefficient. In order to

[64] Iltis, *Inefficiencies*, 20.

properly use this technique of changing the size of the oral cavity to increase efficiency and stamina, a horn player must find a way to make these techniques more accessible. To do this, a study of language and singing is a powerful tool.

By using consistent air pressure, subtle use of the embouchure, the use of elevators, and tongue positions together, horn players can find a more efficient approach to changing pitch. In order to make the jaw and tongue positions more accessible, students and teachers can study vocal technique to find a more efficient approach to changing the size and shape of the oral cavity. The understanding of how to make the vowel shapes will naturally shape the oral cavity to allow for both efficient elevators and tongue position simultaneously and with a fluid, non-mechanical motion.

Vocal pedagogues focus on the inter-oral shape to create specific vowels. In the chapter titled, *The Well-balanced Vowel* from his vocal pedagogy book, Richard Miller explains that singing allows defining a more precise phonetic position of a vowel. "Although vowel postures, represented by specific phonetic symbols, are not static or set postures in singing, they tend to resemble the "model" postures described by a phonetician."[65] For example, in speech, one will often move through vowels at a faster rate than they would when singing. Thus, singing allows the person studying the vowel to see the shape more clearly, creating a more precise vowel shape.

For the purposes of horn playing, students and teachers can study vocal pedagogical techniques to gain a formal understanding of not only what the specific vowel sounds are, but how to effectively form and use them to their advantage in order to

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[65] Richard Miller, *The Structure of Singing: System and Art in Vocal Technique* (New York: Schirmer Books, 1996), 69.

create a more efficient approach to a fluid change between partials. Eli Epstein is an early proponent of using vowels. In his book he writes, "Each pitch on the horn requires a specific air speed, and controlling the oral-cavity size by singing or thinking of different vowel sounds is an effective way to produce the right one."[66] Epstein returns to the analogy of the garden hose to explain what happens when we change vowels:

> Say "oo-ee." What happens to your mouth? When we go from "oo" to "ee", the jaw rises a bit, and the back of the tongue arches. When air is delivered from the windpipe over the base of the tongue, and the tongue is in the "ee" position, the air speeds up as it rushes between the top surface of the arched tongue and the roof of the mouth. Since the jaw rises when we say "ee," the oral cavity becomes even smaller.[67]

Many teachers, if they use vowel shapes, have their own ideas of which vowels should be used for which range. Epstein uses a specific set of vowels for specific ranges, something he developed during his time in the Cleveland Orchestra. His vowels, along with articulation positions can be seen in figure 3.10.

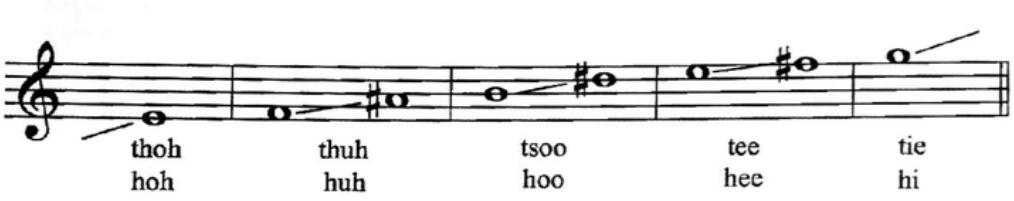

Figure 3.10: Eli Epstein, *Horn Playing from the Inside Out: A Method for All Brass Musicians (*Brookline, MA: Eli Epstein Productions, 2012), 17.

Other teachers have less-specific, but still useful, vowel sounds and ranges that they pass to their students. William Scharnberg uses "oo midrange to 'she' for top notes [and] OH for low notes."[68] Larry Lowe of Brigham Young University says "I show them

[66] Epstein, *Horn Playing,* 16.

[67] Ibid, 16.

[68] Scharnberg, Interview.

that the highest syllable is with the mouth and uu with the lips [like] the umlaut, and show them how to preserve the uu with the lips as the vowel inside the mouth morphs into oo."[69] Jesse McCormick of the Cleveland Orchestra has a similar approach to the vowels. He uses "EE for high to extreme high range. AAH for mid range. OH like the word "hold" for low. These syllables position the tongue appropriately for proper air flow in each respective range."[70] Lydia Van Dreel at the University of Oregon says, "Eh for high register, ah for mid, aw for low. I also talk to them about how everyone is uniquely shaped and encourage them to explore their own resonance and efficiencies when producing sound."[71]

When one examines this small sample of horn pedagogues and their use of the vowels, it can be seen that, although each person has a different approach to the vowels with both specifics and extent, there are similarities that can be found. Most of the horn teachers interviewed use an "Ah", "Oh", "OO", or something similar for the low pitches and an "E" or "I" for the higher range. There is logical reason for this, which can be found in vocal pedagogy. The easiest way to discover the difference in vowels is to employ the technique of the "half-whistle". This is a technique achieved by whispering the vowels inside of the mouth, creating a faux-resonating chamber between the cheeks. When one whispers Oh, Ah, Ay, Ee in succession, he or she will notice that the pitch will ascend, caused by the increase of airspeed over the dorsal edge of the tongue and

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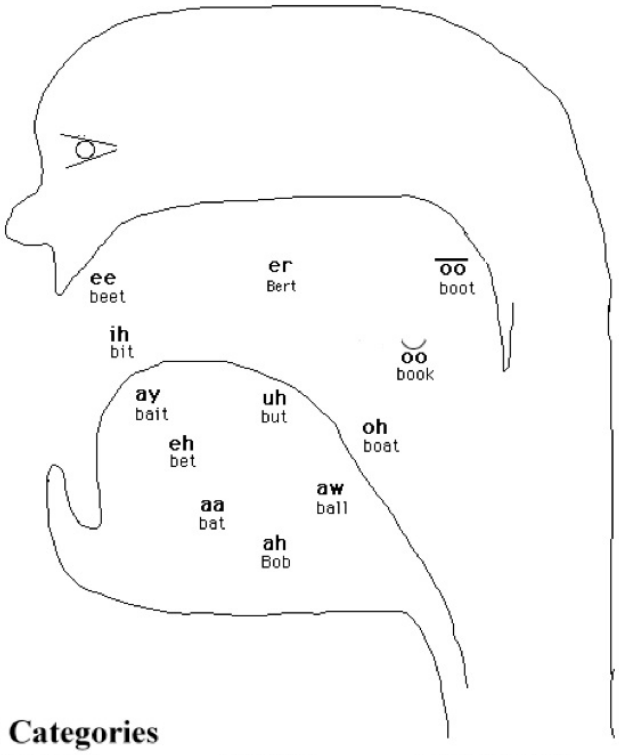
[69] Lowe, Interview.

[70] McCormick, Jesse, Interviewed by Jon Holloway. March 3, 2016. E-mail Interview.

[71] Lydia Van Dreel, Interviewed by Jon Holloway. March 1, 2016. E-mail Interview.

decreased oral cavity. Each of the vowel's tongue positions are different in the mouth and have a corresponding relationship to the size of the oral cavity. This can be seen in figure 3.11.



Vowel Categories

5 FRONT VOWELS----------					3 MIDDLE----------			4 BACK VOWELS----------			
ee	**ih**	**ay**	**eh**	**aa**	**ah**	**uh**	**er**	**aw**	**oh**	**oo**	**oo**
Pete	Jim	Dave	Ted	Dan	Bob	Bud	Bert	Claude	Joe	Woody	Lew

Figure 3.11: Ted Norton, "Singing Better Vowels." MusicEd Ted, Accessed August, 2016, http://www.musicedted.info/SingingBetter2/Vowels.html.

The issue of what to call the vowels is problematic among the horn players and teachers interviewed. With no fixed idea of how to write a vowel sound, confusion can be created. For this, one can again turn to vocal pedagogy. The International Phonetic Alphabet (IPA) is a resource used by vocalists to be certain of a specific vowel sound and shape regardless of the singer's spoken language. Of the many horn players and teachers interviewed, none were aware of or used IPA symbols in their vowel use; this could be caused by the fact that most didn't use the vowels in a specific manner, i.e., wide ranges for non-specific sounds, and not a specific vowel for each partial. The use of the IPA for

creating vowel sounds has the ability to clearly define specific vowels and dissolve confusion amongst young players and players who speak different languages.

For the purposes of this project, only ten IPA symbols will be used, seven of which are monophthongs (or pure vowels), and three that are diphthongs. A monophthong is a vowel consisting of one sound, like the letter E, or "seat", while a diphthong is a vowel consisting of two, like the long form of the letter A, or the word "face". Although the pure vowels lend themselves best to playing the horn, it has been found that many teachers use the three diphthongs in their pedagogy and that they are easily accessible to students. These ten symbols are as follows: [u], [oʊ], [ʌ], [ɑ], [ɛ], [æ], [eɪ], [ɪ], [i], and [aɪ]; of these, the three diphthongs are [oʊ], [eɪ], and [aɪ]. An easy guide to the pronunciation of these sounds can be seen in figure 3.12. Although it is important to note that not all vowels will be the same for all horn players, based on the results in Dr. Iltis' studies, the elite horn players were in similar positions for the same pitches, with only slight variations. These vowels were chosen for their corresponding partials with the range of the horn, the position of all vowels, and the mean positions of the elite horn players combined.

IPA Cheat Sheet!

IPA symbol:	u	oʊ	ʌ	ɑ	ɛ	æ	eɪ	ɪ	i	aɪ
Sound:	OO	OH	UH	AWH	EH	AH	AY	IH	EE	I
Example:	Food	Go	Cut	Jaw	Get	Cat	Play	Sit	See	Eye
Pitch:	Below Low C	Low C	Low G	Middle C	E	G	3rd Space C	F	G	High C

Figure 3.12, Illustrated by Jon Holloway

When looking at this chart, only the open pitches are represented. That is because in order to play the pitches with the valves (the chromatic pitches), one needs to understand how each partial works. Within each vowel, there is a less or equal than

approach to understanding how to play the entire range of the horn. As the valves are used to descend chromatically, the length of the tubing is changed. For example, if there is a bottom-space f written, one would use the [æ] vowel, as f belongs to that partial. The middle c, or [ɑ] partial consists of c, b, b-flat, a, and a-flat. The next open note below that is low g, which is played with the vowel [ʌ]. Essentially one would decide which vowel to use based on the next highest open note.

Part D: Formation of the Vowels

When forming these vowels, one can relate to a landmark, or a vowel, that remains constant and exists in a rest position. This is the pure vowel [ʌ]. [ʌ] is commonly referred to as "uh" and is found in the word cut. Richard Miller writes about the position of this vowel, "When one is at a state of repose, without exaggerated respiratory activity, the tongue is relaxed in the mouth, with its blade in easy contact with the lower teeth."[72] Furthermore, the teeth are relaxed but not touching. This is what Miller calls the "home base" for the speech mechanism, and is also how we form the monophthong, [ʌ].[73] Because this is the home base for speech, and the most relaxed position, a horn player will find that this is a great vowel to use for a relaxed note, a low g. There are notes and vowels below, and a great deal that are higher; however, the nature of the relaxed posture of the [ʌ] sound, lends itself to the partial right below middle c.

Moving below [ʌ] is the next sound, [oʊ], and it is used to achieve the next lowest partial, low c. [oʊ] is one of the three diphthongs, and sounds like the long letter O, found in words, such as: boat, go, or glow. To achieve this shape from the resting position of

[72] Miller, *The Structure of Singing,* 69.

[73] Ibid, 69.

[ʌ], both the jaw and the tongue should be lowered in the mouth to increase the oral cavity, a technique used by the elite players in Dr. Iltis' studies. Looking back to figure 2.9, the [oʊ] partial is what Iltis refers to as "Eb2" and is the lowest partial on Seraphinoff's MRI-horn. Because the modern double horn has the ability to achieve a lower partial than the low c, the pedal f, there must be lower vowel position to achieve that pitch.

The pedal f, which is achieved by playing the lowest partial on the Bb side of the full-double horn, is best played with the vowel sound [u]. This is the sound found in words like cook or book. The jaw drops to an even lower position than the [oʊ], and the tongue moves to the back of the mouth, with the tip reaching below the bottom teeth. This creates the largest oral cavity possible, which allows the air to move slower.

Moving up from the home position of [ʌ] is the middle c, a note that is achieved by using the [ɑ], or "AH" syllable, found in words like calm, jaw, or straw. Miller writes, "When singing [ɑ], the lips part, the mandible lowers, and the tongue lies flat on the floor of the mouth cavity."[74] Although the ʌ vowel, according to Miller is used for the most "neutral" and "primitive" vocal expression, students are generally most comfortable with the ɑ sound.[75] It is what many of their band directors use in their classrooms when singing, and although it is very similar to [ʌ], [ɑ] has the tongue a bit higher in the mouth. Because it is most comfortable and familiar for students, [ɑ] is used for their middle c.

The next two vowels are very similar in nature, but are differentiated by a slight change in tongue elevation. This can also be seen in Iltis' work and in figure 2.9. The

[74] Miller, *Structure of Singing,* 71

[75] Ibid, 70

difference in mean tongue movement between G3 and Bb3 is minor, and will be for the students as well. However, on the modern horn, these two pitches are bottom line e, and second line g. The vowel used for bottom line e is the vowel [ɛ]. [ɛ] is the sound achieved in words like get or bet, and is somewhat higher in the mouth from the [ɑ] sound of middle c. Second line g is achieved by raising the tongue slightly in the mouth, as the interval is a minor third, the smallest interval thus far. The vowel for g is [æ], the vowel that sounds in words like bat or cat. The difference between these two notes, although minute, is still enough to change the speed of air.

Moving to third space c, one arrives at his or her second diphthong. This diphthong, much like [oʊ] is used because of its immediate accessible nature to students, as it is a common vowel to sing. [eɪ] is the vowel sound found in words like bay or play, and is a long A sound. This vowel allows the air to go twice as fast as the middle c's [ɑ] syllable by essentially making the oral cavity half as big; although, the measurements in Dr. Iltis' work don't equate to exactly that. This is because of other factors involved in the achievements of pitch by the elite players including airspeed and embouchure movement. However, looking back to figure 2.9, the Eb3 is near -8.00 mm of Δ position, while Eb4 is close to -4.00.

Above third space c the notes become close together, the jaw movement (as seen in Dr. Iltis' studies) becomes miniscule, and the tongue is responsible for most of the changes between notes. This study, because of the closeness of the pitches in the upper register, will focus on the "open notes" above third space c. For students, this eases the amount of vowels needed to learn and therefore makes for a more simple process. Perhaps more importantly, most performers and students will be playing on the modern

double horn and, with third space c and above, will be utilizing the B-flat side of the horn. When on the Bb side, the partials are further apart and different. However, notes like third space C, top of the staff g, and high c are still open notes with the thumb valve depressed. Students can understand the close relationships of these notes with a simple explanation when they have a vowel to use in that register.

Because the thumb valve will be depressed, the next note to focus on is top line f, an open note and in-tune partial on the Bb side of the horn that is the direct equivalent to the third space c of the f side of the horn. The vowel to be used for the top line f is [ɪ], the vowel sound found in words like lit or bit. The jaw position for this vowel is very similar to the diphthong [eɪ], but the tongue is slightly higher in the front of the mouth, creating a smaller oral cavity. When one creates [eɪ] he or she will have a similar shape at the end of the diphthong to the shape they should make at the beginning of [ɪ].

The partial above f is a major second away. G and the pitch above it, a, are best played with the vowel [i]. [i] is the vowel sound for the long E, and can be found in words like seat or beet. For younger students, the [i] sound is a vowel that can be used for all of the notes in the partials above [eɪ], adding in the subtle difference of [ɪ] at a more advanced stage. However, the difference between the [ɪ] and [i] becomes quite important in the advanced stages of playing horn because of the necessity to differentiate both accurately and quickly between f and g.

Richard Miller writes that [i] is the "most frontal of all the vowels (the closest, regarding forward tongue posture)."[76] While this is true, it is often seen in students that using the next vowel shape will create an even higher version of the [i] in their mouths.

[76] Miller, *Structure of Singing*, 71.

Our third and final diphthong, used for anything above an a, is [aɪ]. [aɪ] is the long I sound, like the word eye, and when said, achieves a similar posture to [i]. Because of this, the accomplishment of the higher notes are essentially a higher position of the [i] vowel, but with a visualization of just a slightly higher tongue along with the employment of faster air.

Once a performer or student is able to understand the concept of the IPA symbols and their corresponding vowel sounds, he or she can begin to relate them to the specific pitches. Since each vowel represents a specific partial on the horn, students can begin to sing these on the corresponding pitches, preferably with a drone. Singing, as Miller writes, can more precisely define a more "recognizable phonetic position" because the vowel is employed for a longer period of time than with speech.[77] This not only allows students to master the shape and feeling of the vowel, but to also help in accuracy of pitches, something that is paramount for a horn player. Using the second section of Jon Holloway's new routine for horn can allow for the mastery of the vowel shapes and their ability to provide efficient and accurate pitch transition on the horn.

[77] Miller, *Structure of Singing*, 69.

Chapter 4: The Consonants
Section A: Understanding Articulation

In order for a student to understand how to use their tongues efficiently through the use of vowels, he or she should also be aware of the tongue's other function, the consonants. In horn playing, consonants are used to articulate a note, which is how one shapes his or her air for the initial vibration or beginning of a note. Because of this, the articulation used has the ability to affect not only the style of the vibration, but the tone and intonation of the instrument throughout a phrase. The tongue, explained previously, has three sections that have the ability to move independently of each other. The tip or apex is able to move while the body of the tongue can remain in a vowel position. This will allow a horn player to articulate the beginning of a pitch on a wide variety of vowel postures.

Brass pedagogues have spent much time explaining their ideas of the best way to articulate. Arnold Jacobs explains the tongue in a manner congruent with his ideas to focus less on how the sensation itself feels, but more on the sound the articulation provides. He says, "I would suggest that the student be more aware of what good articulation should sound like, rather than what it should feel like. With success, in good articulation, will come sensations with which the player can familiarize himself."[78] Through this quote, Jacobs is explaining how to achieve a quality articulation in spite of there not being much information sent from the sensory nerves in our tongue to the

[78] Fredericksen, *Song and Wind,* 128.

brain.[79] While this is true, it is still important to understand how the tongue is able to create the articulation while keeping the ideal sound in mind.

Farkas breaks articulation down into two categories, slurring and tonguing. He says, "Of the two fundamental articulations, tonguing achieves by far the greatest variety of effects. These can range from the gentlest, most smooth attack, played *pianissimo*, to a literal explosion of sound."[80] He goes on to explain his ideas on different articulation styles with how the air is both affected and interrupted. His ideas on tonguing in their entirety can be read in chapter 9 of his book, *The Art of French Horn Playing*. Both Farkas and Jacobs believe that the idea of calling the initial articulation an "attack" is problematic, as it invokes an idea that the air pressure should somehow be increased at the initial onset of air. Jacobs says, "The tongue should be used as a focusing tool, not as a valve to stop the air."[81] When Farkas speaks to the misnomer of the word attack, he brings the mechanics of articulation into the conversation, "The word "attack" is misleading, as it infers a thrust forward."

Farkas is not the only pedagogue to agree that the tongue pulling away from the point of articulation creates the interruption of the air; modern pedagogue Eli Epstein agrees. He writes, "I like to think of the tongue as *moving back* from a point of articulation rather than striking with a forward then backward motion (even though our tongue needs to come forward in order to come back)."[82] The motion of the tongue is

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[79] Ibid, 128.

[80] Farkas, *Art of French Horn Playing,* 49.

[81] Fredericksen, *Song and Wind,* 128.

[82] Epstein, *Horn Playing,* 22.

important to master if one hopes to achieve clean articulations. Because of this, the idea of where and how the tongue should strike is a contested topic.

Farkas writes about his ideal strike position, "Keep the main body of the tongue motionless and well down in the bottom of the mouth. Then curl the tip of it upward until it resembles the point of a ski. Touch this tip to the gum line where the back of the upper front teeth enter the gums."[83] Farkas believes that the tongue, because of its size and heavy nature, is difficult to move in its entirety. The tongue should be helped by the air, and by using a smaller motion, will allow the tongue to move across the airstream and not against it.[84]

Eli Epstein teaches a dynamic point of contact for each range of articulation, suggesting that the lower a note is, the lower the tongue should strike in the mouth, even articulating between the teeth in the lower register of the horn. He believes that it allows, with the vowels, for regulation of the air speed. He says, "The basic principle is this: The higher the tongue's point of contact, the faster the initial speed of air… the area above the tongue becomes smaller and smaller, and the initial air speed increases."[85] He explains how this theory can help play low notes more accurately, "Conversely, if the point of contact of the front of the tongue is lower (for example, touching the bottom edge of our two front teeth), the area above the tongue increases in size and the initial speed of air decreases."[86] This is incongruent with Jacobs's ideas about controlling the tongue based

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[83] Farkas, *Art of French Horn Playing,* 49.

[84] Ibid, 49.

[85] Epstein, *Horn Playing,* 20.

[86] Ibid, 20.

on sound due to the small amount of sensory information being sent from the tongue to the brain, and can lead to an inefficient use of the tongue, as the motions that cause different articulation points can become mechanical and strenuous.

When talking about point of articulation, Jacobs concentrates on something musicians can rely on, speech. Much like the use of the vowels, making use of a consonant is something of which both performers and students are aware. In his book about Arnold Jacobs's teachings, Fredericksen writes, "Rather than concentrating on the position of the tongue, Jacobs relies on a proper signal being sent from the brain with that musculature of the tongue responding naturally."[87] He, along with Farkas, believes that using conversational technique for articulation is the most effective, and that we can solve articulation problems through speech.[88] Jacobs taught, "Just as no two performers are alike, no two people's tongues are alike. Therefore, the correct tongue position depends on the person."[89]

Articulation, much like vowel positions, can be achieved through employing vocal and speaking techniques. Consonants are something that nearly every performer employs on a daily basis. Because of this daily use, students are often already expert articulators. They only need to be taught how to use the information they already have in relation to their instrument through the use of consonants. A student can understand how and why they are able to make clean note beginnings through consonant articulation by turning to speech. These ideas are congruent with the basic teaching of pedagogues such

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[87] Fredericksen, *Song and Wind,* 128.

[88] Ibid, 127.

[89] Ibid, 126.

as Jacobs, Farkas, and Epstein, but are more accessible to performers of all levels, much like the use of vowel postures for pitch change.

Many pedagogues spend much time in their teachings explaining how the mechanics of the tongue work, yet understanding how the tongue can affect the air is most important. During a phrase, the tongue merely interrupts the air, while at the beginning of a phrase, the tongue works with the air to shape the initial airspeed. This will allow a performer to have a clean articulation in any style. Students should be aware that their air-stream should remain constant, but begins by a push from the initial exhale; this is an aspirated [h] sound and is practiced in the flexibilities exercise. In order achieve a clear and focused initiation of the note; the tip of the tongue is used.

Understanding which consonant to use is defined generally by the style of the music and articulation that is desired. It is necessary to understand that the tip acts independently from the body of the tongue, and that movement to the vowel posture of the pitch should be quite fast. A general rule is that a vowel is a lifelong friend, and consonants are merely passing acquaintances.

Many brass pedagogues agree that there are essentially two consonants used for articulation, the style of which is determined by the speed of the tongue and initial pressure of the air. Farkas and Jacobs both use [t], like in the word "talk", and [d], like in the word "dog". Farkas says, "Enunciate the various forms of "too" or "doo", depending on the intensity of the attack desired. "Too" is used for hard attack and "doo" for soft attack."[90] Jacobs has a similar idea, "Wind players use only a few consonants to attack notes. The "D" consonant is commonly used for playing legato passages, "K" is used in

[90] Farkas, *Art of French Horn Playing,* 50.

double or triple tonguing… The most common is the "T" consonant."[91] Even though generally only [t] and [d] are used, a performer may alter the articulation with airspeed to create a multitude of accents and styles.

Both [t] and [d] are plosive or "stop" consonants. Plosives are consonants that are used to stop or briefly interrupt the air from the vocal tract. All of the consonants horn players use to articulate are plosive consonants, [t], [d], [k], and [g]. [k] and [g] are used in double and triple tonguing techniques and are created by the body of the tongue. The tip of the tongue creates the plosives [t] and [d], and therefore are used to articulate most often. In his book, *Singing, the Mechanism and the Technic,* William Vennard classifies the vowels [d] and [t] more specifically as lingual alveolars, "[[t] and [d] are] *post-dentals*, made with contact with the ridge behind the teeth. This is called the *alveolar* ridge and so the post-dentals are also called *lingua-alveolars*."[92] The placement of these plosive consonants at the alveolar ridge are congruent with the placement of the tongue as defined by Farkas.

Section B: The Routine's Articulations

For help in articulation, one can turn to the routine for an exercise that explains the most efficient way to articulate. The routine's articulation exercise is designed to have students play the same pitch at the same speed, only varying the consonant and abdominal pulse of articulation to achieve many different effects and styles. The section in the routine on articulations also provides examples of some of the more common articulations, and how to play them correctly. This table can be seen in figure 4.1.

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[91] Fredericksen, *Song and Wind,* 128.

[92] William Vennard, *Singing: The Mechanism and the Technic*, Revised Edition, Greatly Enlarged, (New York, Carl Fischer, 1968), 171.

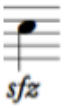
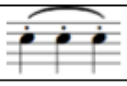
Articulation	Marking	Consonant	Length	Air
Tongued		[t] or [d]	Full	Normal
Staccato		[t]	Separated, about ½	Normal
Legato		[d]	Full, smooth, and connected	Normal
Accent		[t]	Full	Weighted
Marcato		[t]	Heavy and separate, about ¾	Heavy
Sforzando		[t]	Varying	Sudden weighted accent
Portato		[d]	Full and connected	Pulsed

Figure 4.1: Jon Holloway, *Daily Warm-Up Routine*.

When playing these exercises, students are asked to perform at varying speeds, volumes, and keys. This will give the student practice on all ranges of the horn, which can then translate to their etudes, solos, and excerpts. This part of the routine also uses subtle reminders through text that help students to continue to be reminded of the task at hand. They are asked to visualize and quantify the difference between articulations in real time; they will then have a better understanding of, for example, the differences between an accent, marcato, and sforzando, all at the same volume, tempo, and range. This will help to create more effective performers when the skills learned in this exercise are put into the context of solos, etudes, and excerpts. An excerpt of the articulation exercise can be seen in figure 4.2 below.

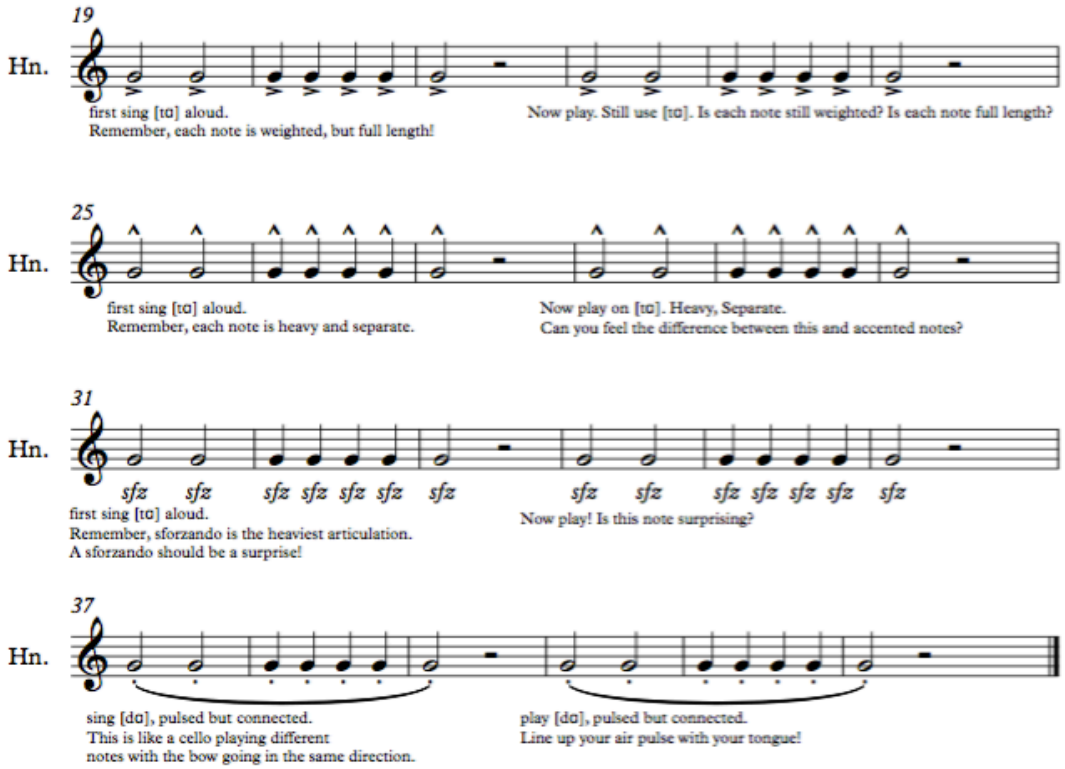


Figure 4.2: Jon Holloway, *Daily Warm-Up Routine*.

The routine's articulation exercise requires a student to sing aloud each articulation, helping them to not only get a chance to vocalize the pitch, but the corresponding vowel and consonant as well. Relating the articulation to a singing exercise will help the student to understand exactly where he or she will want to articulate in the mouth. Finding a point of contact while speaking or singing helps to find the most natural place inside of the mouth for the articulation at the alveolar ridge.

By finding where the tongue contacts the roof of the mouth during the plosive consonants, a performer can understand, with that given vowel, where they are comfortable and tension exists the least. This shows that while Epstein's ideas of a different area of contact for articulation might not be the most efficient way to articulate, there is a possibility of a dynamic point of contact during articulation. Freeing the tip of the tongue to strike at its most natural position will alleviate excess tension, allowing

both the consonant and vowels to be more efficient. This will provide a clearer articulation, leading to a vowel that is clearer. If the tongue moves in a natural and efficient way, it will not only be able move faster, but it will also have the freedom to form many different expressions without adversely affecting the tone of the performer.

Chapter 5: The Flexibilities
Section A: Playing Flexibilities

To become more comfortable with the vowels, their shapes, and moving between them, performers may put them into practice in their daily routines. Exercises known as lip slurs by many brass pedagogues are a common practice among brass players. However, the term lip slur is a misnomer, as performers should not use the lips alone to change pitch. These lip slurs can be used to exercise a wide variety of the modern horn player's needs; but, because of the misnomer, the routine suggests using the term flexibility to help in the more accurate practice of these exercises. Flexibilities can be used as a tool for perfecting the changes between vowels and do not necessarily need to be a part of just a warm-up, but can serve as flexibility, tone, intonation, and practical application training as well.

In order to play flexibilities effectively, the performer should use his or her vowel shapes in conjunction with the three main rules: consistent air speed, engaged smiley muscles, and a consistent point of contact at the aperture. When these are engaged and the performer is using the proper relaxed and efficient breath discussed in the long tone exercises, the flexibility will help to create efficient habits that build towards effective performance of the horn. When flexibilities are played, the performer should have a metronome, tuner, and drone in use as they would with the long tones exercise. This will allow the flexibility, beyond the vowels, to also fine tune intonation, tone, and timing.

Flexibilities are studies that generally center around pitches on the same valve-combination, changing only the partials. This will allow the performer to focus on a variety of ranges of the horn, from a one partial difference through four octave changes and everything in between. A performer can accomplish this while still maintaining a

lesser degree of difficulty. Because of this, the performer can improve upon his or her basic needs without the need be concerned about musicality, fingering patterns, dynamics, or other issues that would be a part of practicing etudes, solos, or excerpts. An example of a simple flexibility can be seen below in figure 5.1. The student should place a consonant at the beginning of each flexibility exercise which should vary day to day.

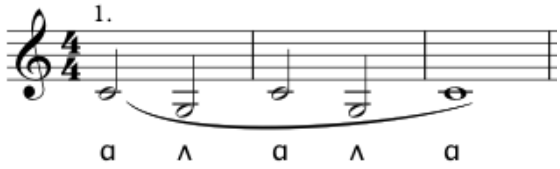


Figure 5.1: Jon Holloway, *Daily Warm-Up Routine*.

The routine provides nineteen basic flexibility exercises for the horn that cover a variety of ranges; however, students are encouraged to write their own. By creating their own lip slurs, students will engage in a constructivist learning opportunity that will help them to gather a better understanding of their horn, their vowel shapes, and how to properly construct an exercise. Once students have mastered the basic flexibilities, they will find that they can use a flexibility exercise to build a better understanding of specific problems they may have in their solos, etudes, or excerpts. When creating their own flexibility exercises, a performer is asked, at the beginning stages, to follow two basic rules. These rules are to not skip partials, and to start and end on the same pitch. This process should be guided by a private instructor who should take turns composing flexibilities with the student.

Part B: The Five Steps of Flexibilities

The flexibility exercises in the routine can be learned, practiced and perfected by following a simple five-step process that will allow the student to put their understanding of not only vowel shape into practice, but also their ability to follow the three rules:

consistent air speed, engaged smiley muscles, and a consistent point of contact at the aperture. The steps are designed to allow students a progression of difficulty in their learning of an exercise from the very basic vowel production, to playing the flexibility in its entirety on a variety of valve combinations. To do this, performers are required to make use of their IPA skills, a drone, and their metronome, also giving them practice with phrasing, intonation, tone and time. In order to explain the five steps, the first flexibility (figure 5.1) will be examined.

The first step of playing flexibilities is to understand the pitches and vowels associated with the exercise. For flexibility number one, the notes are middle c and low g. The vowels associated with these notes are [ɑ] and [ʌ] respectively. The student will start his or her drone on the first pitch, the middle c. If their drone is in concert pitch, and not in f, they should be using f for their drone. With a slow tempo in their physical body, i.e., a foot tap, a snap, a clap, conducting, etc., the performer will sing the flexibility on the vowels, attempting to form not only pitch and oral cavity accuracy, but to make the changes immediate with a goal of getting to the sung vowel as soon as possible.

The second step is to whistle the exercise. As discussed earlier, whistling is one of the skills where the main way to change the pitch is by manipulating the oral cavity. The inside of the mouth functions much like a bottle of liquid, and because of this, is a perfect way to practice oral cavity and vowel's effect on the pitch. If a performer or student is unable to whistle, he or she should employ the half-whistle, or pitch whisper technique. The half-whistle is a technique of allowing the air to rush through the oral cavity, producing a pitch. The feel inside of the mouth is very similar to that of a whistle, just with the lips open. The change of pitch is achieved in the same manner as a true whistle,

thus employing a similar technique. When the performer whistles, he or she will focus on the vowel shape inside of the mouth. For example, in exercise one, that will be [ɑ] and [ʌ]. During singing, the performer can sing any pitch on any given vowel; however, because of the oral cavity's effect on the whistle, the vowel shape will determine the pitch. This is very similar to playing the horn, and is the reason whistling is used for step two. With the drone still playing, the performer will whistle the exercise in a similar manner to step one. He or she should be using a physical tempo and attempting to achieve the pitch as soon as possible with a smooth transition and steady airstream.

Step three brings the horn into the exercise, and employs an articulation. Articulation is used to help regulate the beginning of the note and focus on the separation of the tip of the tongue, used for the actual articulation of the note, and the body of the tongue, used for the changing of the oral cavity to achieve the vowels. An excellent example of the independence of these two parts of the tongue can be seen in Sarah Willis's YouTube video previously discussed in this document. Step three comes in two parts, the first is an air-only attack achieved without the tongue by an h articulation. This allows the performer to practice using the vowels without the initial use of the tip of the tongue for articulation and also requires the performer to line up the initial air with the shape of the vowel. Each note will be short and separated. Like both singing and whistling, the air articulation should be performed with the drone and a physical tempo, in lieu of the steady air stream, the performer should strive to have the air speed and pressure the same for each note. The air attack version of the flexibility can be seen in figure 5.2.

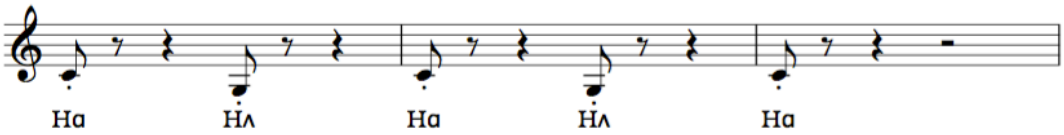


Figure 5.2: Jon Holloway, *Daily Warm-Up Routine*

After the air articulation is perfected, the student will add in the tongue articulation. The most common articulation will be a staccato "t" articulation, but can also be practiced on a variety of articulations that should be varied day to day. For example, one day a student could play each articulation with a marcato accent, and the next, articulate the pitch with a softer legato tongue. Regardless of the tongue's motion, the notes, like the air attacks should be short and separate, as the purpose for this is to practice moving to the vowel quickly. A general rule is to get to the tone of the note as quickly as possible. An example of how to articulate step three can be seen in figure 5.3 below.

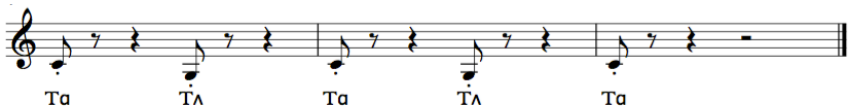


Figure 5.3: Jon Holloway, *Daily Warm-Up Routine*.

Step four is to play the slur as written. The student will still employ the use of the drone and a physical tempo, as well as use the steady air pressure and speed practiced in the previous three steps. The purpose of this step is to achieve a smooth transition note to note, changing the oral cavity between vowels quickly as to achieve the tone of the note as soon as possible. The student should think back to how quick the tongue and jaw form the vowels in step three, and work to make the transitions in the slur just as fast. This along with a consistent air speed, engaged smiley muscles, and a consistent point of contact at the aperture will make a smooth, consistent exchange from note to note.

Step five is to play the flexibility as an exercise. When playing this step, the students will stop the use of the drone, and begin the use of a metronome. Here they will play the slur as written, and then play the same flexibility through much of the valve series down to 1&2, and back up to open, i.e., open, second valve, first valve, first and second, first valve, second valve, and open. This particular flexibility will be performed beginning on c, b, b-flat, a, and back up to c. An example of this exercise can be seen below in figure 5.4. When performing a flexibility on several different valve combinations, the partials will remain the same, and consequently, the vowels will remain the same. Using the valves simply makes the horn longer, lowering the pitch of the performed partial.

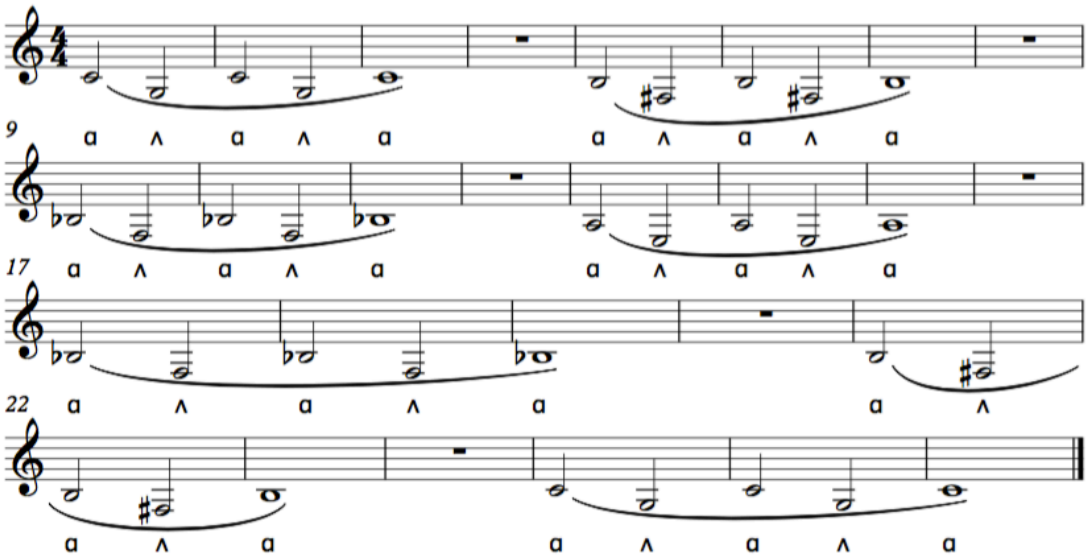


Figure 5.4: Jon Holloway, *Daily Warm-Up Routine*.

The flexibility five-step exercise can be used to help a performer achieve great flexibility and accuracy on the entire range of the horn. This exercise also helps to achieve skills in efficient breath control, intonation, tone, and timing. When the student uses his or her composition skills to write their own flexibilities, they will also gain an understanding of the horn and how to practice efficiently, becoming expert learners. They

will learn how to tailor exercises to fit their specific needs, and can use these steps to learn difficult passages in their solos, etudes, excerpts, and more.

Chapter 6: Teaching the Routine and Beyond

Due to the many pedagogical resources and different approaches to the instrument, a young student should have a teacher who is able to guide them through the difficult task of learning the horn. Its focus on efficiency and limiting excess tension allows the routine in this document to be an effective resource for not only young players, but players of all abilities.

During their private study, a student should spend time under direct supervision with his or her teacher practicing the three elements of the routine. The teacher may then not only ensure that the student is performing the elements of the routine correctly, but may also aid in guided discovery of these elements. The teacher should encourage the student's curiosity by asking questions about how their physical body relates to breathing, articulation, and flexibilities, how the state of their physical body relates to the horn, and how those two things can effect one another. Students should be considering how they feel, how they sound, and how those two things act upon each other. These are questions students and performers should be thinking about daily, and can use the routine as a tool to focus on those thoughts.

When breathing, the student should be given a variety of tempos through the long tone exercises, not only focusing on pitch and tone, but also focusing on taking different breaths to shape phrases of different lengths. When playing articulation exercises, the student should play the exercise as written, as well as vary the articulations in a given exercise to discover and compare the differences in styles through a musical phrase. During flexibilities, it is important for the student to compose his or her own exercises.

This will not only help them to gain a better command of where the partials are on the horn, but also how those partials relate to one another.

When students are given the tools to succeed along with an education of how and why those tools work, they learn basic skills that are necessary for success on all aspects of the horn. The routine begins with air. Through the long tones exercise, students learn how their bodies breathe, how to breathe without excess tension and how to regulate their breath to shape the phrase. Through their flexibilities exercise, students learn to break down intervals. They learn how to hear them correctly and understand the process through which they can play them successfully. Through the articulation study, students learn how to efficiently perform different articulations, to correctly identify how those articulations relate to musical style, and how to shape that style musically. As they master the routine, students will problem-solve and experiment with their technique, and through this curiosity, will become expert learners.

Section A: Using the Routine

Students can use the routine to help learn difficult passages in their solos, etudes, and excerpts. By employing their knowledge of efficient breathing, appropriate articulation, the five steps, and how all of those things relate to one another, students are able to identify a part of a particular phrase that is giving them trouble, isolate that part, fix the problem, and put it back into context. By employing this on their base-level skills, the expert learning will reach all aspects of their playing. The following section will give some examples of how the elements of the routine can be put into practice to solve various problems using popular horn orchestral excerpts and excerpts from Mozart's fourth concerto.

Understanding how to manage the breath to shape it for our needs is the first element learned in the routine. Varying lengths of phrase are common in horn solo literature. If the breath is not regulated properly, longer phrases can lead to a build-up of carbon dioxide that will need to be expelled. This build-up will cause excess tension through backpressure and can have adverse effects on tone, intonation, and the ability to take a quality relaxed breath for the next phrase. An example of this need to be able to take different size breaths to shape the phrase can be seen in the second movement of Mozart's fourth horn concerto, in figure 6.1.

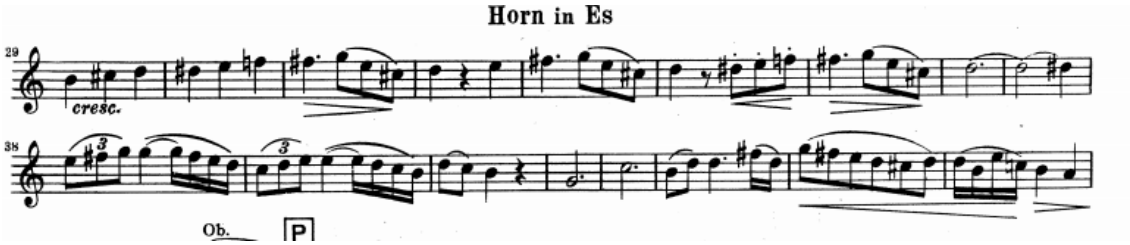


Figure 6.1: Wolfgang Amadeus Mozart, Concerto No. 4 for Horn K. 495, mm 29-45.

When looking closely at this excerpt, the horn player must play from the middle of measure 34 through the middle of measure 40. This movement is slow, *Andante,* and is generally played at about 60 beats per minute. Because of the slow and expressive nature of this movement, playing the phrase from measures 34-40 can be extremely difficult without a quality, regulated breath. The problem a horn player will have with this excerpt is that the phrase immediately before, in measures 32-34, is quite short; if a full breath is taken in measure 32, it will cause the breath in measure 34 to be inadequate in size or preceded by an exhalation, which is quite difficult to achieve in the span of an eighth rest. If this happens, the quality of air through the long phrase will be adversely affected by tension built from the excess air. This may cause the tone and phrase to suffer. Through understanding how to regulate breath, and shape air for their artistic needs, a student can

experiment to find the best breath for these measures. A suggestion can be found in figure 6.1a.

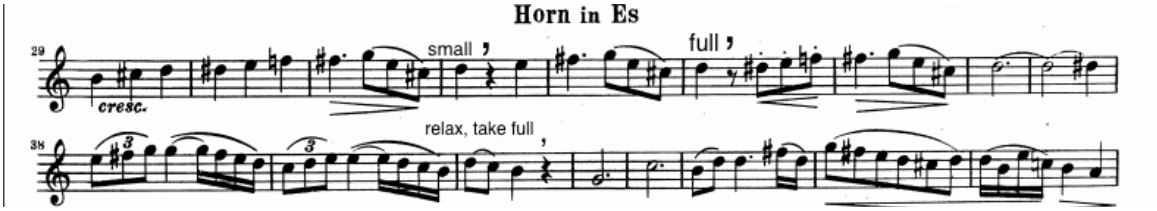


Figure 6.1a: Wolfgang Amadeus Mozart, Concerto No. 4 for Horn K. 495, mm 29-45.

The markings in figure 6.1a are just one of many ways that a student can mark reminders in their music; they should be tailored and personalized to their specific needs. Understanding how to mark music will be perfected through experimentation, and leads the students along their paths to becoming expert learners.

Looking again to the second movement, students can find difficulty in articulation. They are faced, in this edition, with staccato markings in a singing style. Through listening to performances of the movement and conversation with their teacher about how articulation can affect style, the student may want to use the skills learned in the routine to regulate how he or she will articulate the passage seen below in figure 6.2.

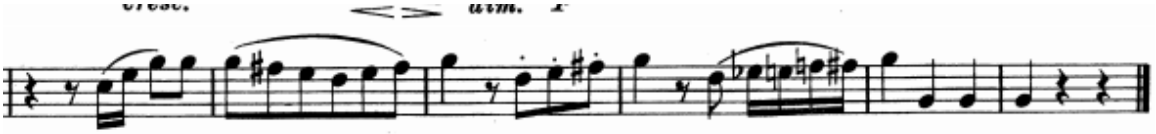


Figure 6.2: Wolfgang Amadeus Mozart, Concerto No. 4 for Horn, K. 495, mm 84-9.

The student may already be articulating many of these notes with a [d], but is faced with a choice when it comes to the staccato notes in measure 86. They may choose to alter some of the articulations to fit the piece's stylistic needs. Through study of the piece they can hear how many of the well-known horn players perform this line. Through listening to recordings, they will find that both Barry Tuckwell and Dennis Brain play the staccato notes nearly connected, only pulsing the notes slightly. They also both articulate

the last three eight notes in measure 85. However, Stephan Dohr plays the staccato phrase as two pairs of slurred eighth notes, and former Vienna Philharmonic hornist Günter Högner plays the line in the style as written above. These differences in performance style bring about a teaching moment for the performer who can use their curiosity and problem solving skills to help understand why there are major differences from their written music.

They will, through guided discovery, come to the conclusion that there are many different editions of these pieces, and that there is not necessarily a "right way" to play this passage. They will learn that the style of the music will dictate articulation. By listening to only four recordings, they are given three different interpretations of the same four notes. They should be encouraged to attempt all three options and more in order to truly find not only which feels most comfortable, but to find which style is most appropriate for the piece's performance. After a conclusion, their markings may match the markings in figure 6.2a, turning the marked staccato notes into portato articulations.

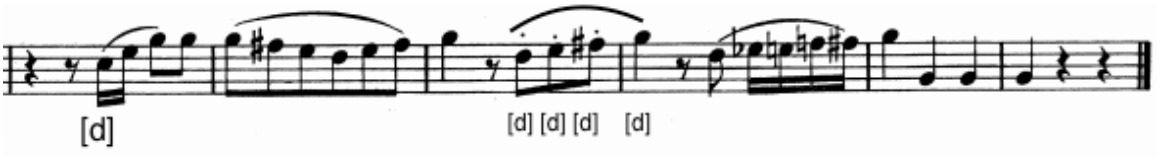


Figure 6.2a: Wolfgang Amadeus Mozart, Concerto No. 4 for Horn, K. 495, mm 84-9.

When a student needs to perfect a difficult melodic passage, they are able to turn to their skills as expert learners and the five steps to break the difficult passage down to the specific intervals giving them trouble, alleviate the problem and put it back into context. This base-level knowledge, built through studying the routine, will allow them to be more successful in all aspects of playing.

One of the first difficult passages is from the first movement of Mozart's 4th horn concerto. This excerpt can be seen in figure 6.3 below.

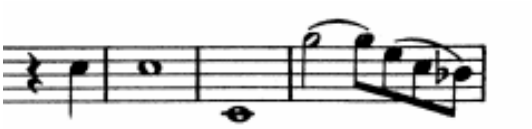


Figure 6.3: Wolfgang Amadeus Mozart, Concerto No. 4 for Horn, K. 495, mm 112-115.

In this excerpt, the horn is required to make two leaps during a melodic line. The first is an octave and the other a twelfth. Many horn players, when playing this passage, will miss one or both of the leaps. Often, this is caused by either undershooting or overshooting the speed of vibration at the aperture. This can be resolved by employing the five steps, as well as remembering to maintain consistent air pressure and speed, engage the smiley muscles, and to have consistent point of contact at the aperture. The student will set his or her drone to a concert e-flat, or b-flat if their drone is set in f. They will first sing the three pitches, using the consonant they decide to use for articulation, [t] being stylistically correct. When playing a piece where transposition is necessary, the vowels will be determined based on the note played, not the note written. For example, in Mozart 4, the horn part is written in e-flat, therefore when a horn player sees a middle c, they will play the b-flat below it.

Once it is sung, they can whistle (or half whistle) the passage, focusing on the motion of both the tip and body of the tongue and their consistent airstream. Then he or she will play the excerpt, using the third of the five steps, to articulate it. The technique for this step can be seen in figure 6.3a.

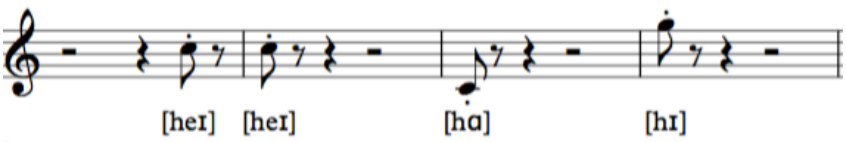


Figure 6.3a: Wolfgang Amadeus Mozart, Concerto No. 4 for Horn, K. 495, mm 112-115

When their air articulations are successful, the student will then move on to playing the articulation with the tongue. The note will be short, and in this case articulated with a [t]. This can be seen below in figure 6.3b.

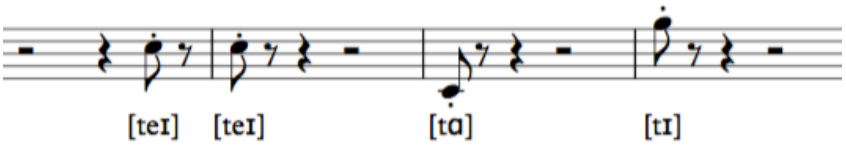


Figure 6.3b: Wolfgang Amadeus Mozart, Concerto No. 4 for Horn, K. 495, mm 112-115

When the pitches are centered and the notes are played accurately, the student will move to step four. They will play the exercise as written, focusing on their articulation and vowels. It is in this step when the steady stream of air is necessary. The change in oral cavity size allows for the air exiting the aperture to move much more slowly during the [ɑ] than the [eɪ] or [ɪ] vowels. Before they were aware of how the oral cavity affects the speed of vibration, a student might have the habit of lowering the air pressure to achieve the descending octave leap to the written middle c. This can cause a change in tone quality, and will make the following leap of an ascending twelfth much more difficult. Using the five steps will allow the student to focus on a steady air stream, which will give them consistent tone, volume, and phrasing.

Step four can be seen in figure 6.3c.

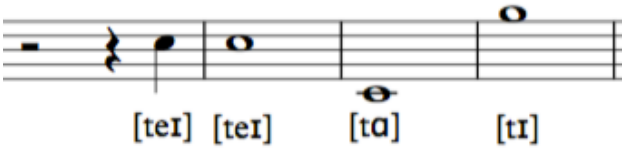


Figure 6.3c: Wolfgang Amadeus Mozart, Concerto No. 4 for Horn, K. 495, mm 112-115.

After step four, the student needs to put the excerpt back in context. The line in context can be seen below in figure 6.3d.

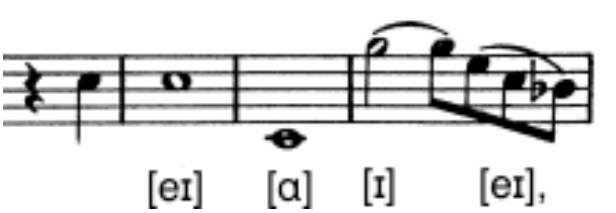


Figure 6.3d: Wolfgang Amadeus Mozart, Concerto No. 4 for Horn, K. 495, mm 112-115.

The five steps can also be used in the context of difficult excerpts. One of the more notorious excerpts for horn is in the beginning of Richard Strauss's *Ein Heldenleben*. This excerpt is found on many college and orchestral excerpt audition lists, and is a necessity for any aspiring professional horn player. A passage of this excerpt can be seen in figure 6.4.

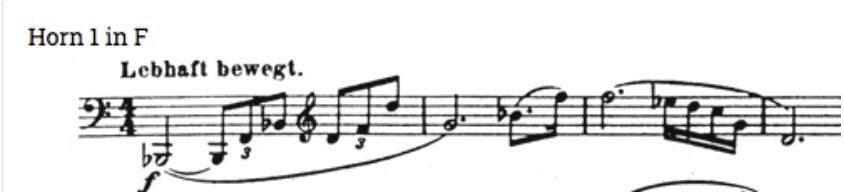


Figure 6.4: Richard Strauss, *Ein Heldenleben,* mm 1-4.

For most players, the first measure is the most difficult. This excerpt spans a range of over three octaves in a slur. This needs to be accomplished cleanly, clearly, and at a *forte* dynamic. Because the first measure is difficult, and the end result is a slur, a student can use his or her skills as an expert learner to turn this measure into a flexibility exercise. To do this, the student is required to compose a flexibility that will help to achieve this passage as an ending goal. One possibility can be seen in figure 6.5.

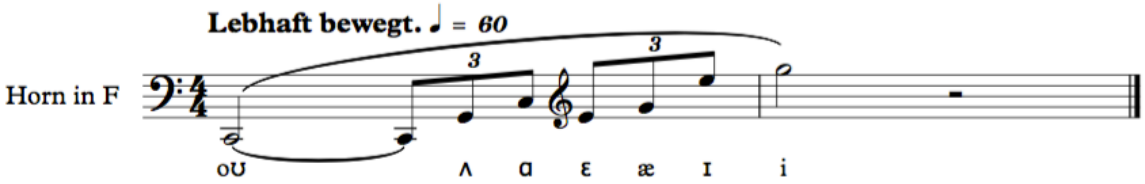


Figure 6.5: Jon Holloway, *Daily Warm-Up Routine*

This flexibility begins on a low c, which is different from the initial pitch in *Heldenleben*. The student will choose to do this because, when playing step five of the five steps, they will play the flexibility not only on this key, but the three below it, one of which is on first valve in the original key of the piece. This will allow the student practice of the same excerpt, on the same partial (and therefore vowel), in four different keys, which will allow them to gain a better understanding of the excerpt as a whole through practice.

After inserting the vowels, the student will sing and whistle the excerpt. They will then articulate it without tongue on [h], then with tongue on [t]. Step four is to play the slur as written in figure 6.5. They will then play step five, an exercise with a metronome as written (starting on open), on second valve, on first valve (the original key of the piece), on first and second valve, then back up to open. If the student has difficulty beyond this particular exercise, they may want to break it down even further. Many horn players have difficulty with beat four of the first measure. Once the student is able to understand what they are having specific difficulties with, they may want to isolate that measure using the five steps, creating another flexibility exercise. This exercise can be seen in figure 6.6.

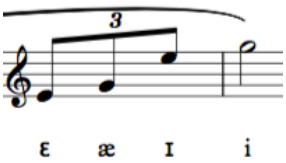


Figure 6.6: Jon Holloway, *Daily Warm-Up Routine*

The student may then put the passage back into context of the first flexibility, then back into the original context of the entire excerpt with a new understanding and mastery of how to play this difficult passage.

Once a student is able to master the skills learned in the routine, they become expert learners. They are able to independently and constructively problem-solve, teaching them not only how to break down difficult sections for technical mastery, but to employ an educated sense of musical style. Students who study the routine will not only have the skills to play the instrument, but they will also have a deeper understanding of how their bodies work, how to relieve excess tension, and how become more efficient performers.

Chapter 7: Conclusion

This routine allows horn players and teachers to find a more efficient way to approach their instrument. They will be able to understand how the shape and size of their oral cavity can affect air speed and, if used properly, will aid the embouchure in both pitch and tone production, leading to more successful and healthy careers. They will understand how to use the IPA to produce consistent vowel postures that will aid the efficiency of the dynamic oral cavity. Along with understanding how vowels can affect their playing, horn players will also understand how learning the plosive consonants can aid in clearer and stylistically appropriate articulations. Horn players can also study the breathing and breath control habits of brass pedagogues and vocalists to gain a better understanding of how to shape and move air through phrases, as well as expand air capacity.

Through studying and understanding one's body map, horn players and teachers will be able to put these pedagogical theories into practice. Understanding anatomy and the use of the body can allow for proper operation of those systems. Complete anatomical knowledge is not necessary for efficient use of the body; however, there are some anatomies of which a horn player should be aware.

Hornists will be able to look to both their newfound anatomical understanding and the practices learned through study of the routine to cultivate a new approach to the horn. A warm-up or daily routine is a very personal and individualized habit for a horn player. It is often learned at a young age and imprinted upon that person in order to exercise consistency and build "good" habits. Although they will already have a daily routine, successful horn players will evolve them periodically to introduce new concepts or

address certain issues he or she may be having on the horn. One of the most important reasons a young student should have a private teacher is to cultivate and introduce this daily routine at a beginning stage. This will build effective habits for the future.

This new routine, outlining and putting into practice the ideas of this document is included in appendix A, and is appropriate for players of any level. This routine focuses on the use of the balanced breath, articulations, and vowel shapes. The routine requires the study of the ideas presented in this research. It is a method that will allow students of all abilities to understand their anatomy, breath, tone production, intonation, articulation, and pitch accuracy in a way that helps to avoid injury and focuses on the efficient use of their specific anatomy. When students follow the new routine, they will not only gain skills in the basic level, but they will also becoming expert learners, attaining skills that will aid in the learning of difficult music.

The practical application of Body Mapping and the use of the routine in horn playing can revolutionize the way young players will approach the horn. They will be able to avoid injury while expanding their understanding of how to play the horn itself, as well as expanding their range, refining their tone and intonation, and learning effective habits that will carry them into the future as self-teachers and healthy performers.

Appendix A
Jon Holloway's Daily Warm-Up Routine!

Congratulations! You have now mastered your IPA vowel sounds and are ready to embark on a new, more efficient approach to your horn! Follow this easy 20-minute daily routine, and you will expand your accuracy, tone, and range in no time!!

IPA Cheat Sheet!

IPA symbol:	u	oʊ	ʌ	ɑ	ɛ	æ	eɪ	ɪ	i	aɪ
Sound:	OO	OH	UH	AWH	EH	AH	AY	IH	EE	I
Example:	Food	Go	Cut	Jaw	Get	Cat	Play	Sit	See	Eye
Pitch:	Below Low C	Low C	Low G	Middle C	E	G	3rd Space C	F	G	High C

Each day before you dive into etudes, excerpts, and solos, you should be playing:

1. Long Tones
2. Flexibilities
3. Articulations

These skills will help improve your overall performance! You will work towards perfecting your time, tone, intonation, articulation, and much, much more!

Long Tones:

Long tones serve several purposes in the beginning of your daily practice. Why should you play long tones every day?

- It helps your lips and embouchure loosen and warm-up!
    - The muscles in your face get a warm-up and work out from eating, talking, and even smiling! Long tones can help focus the specific muscles needed to perform at your highest level.
- Long tones are breathing exercises!
    - By expanding the length of your phrases you will increase air capacity and your ability to control your air speed and consistency.
- Long tones fine-tune your tone!
    - During long tone playing, you can listen to your sound for inconsistencies and strive for that characteristic sound.
- Long tones help your intonation!
    - Playing with a drone will fine-tune your ability to finely tune! Listen to and perfect your intervals and individual pitches throughout the range of the horn.
- Long tones perfect your time!
    - By playing each exercise with a metronome, you will continue the path to ingraining great internal time.

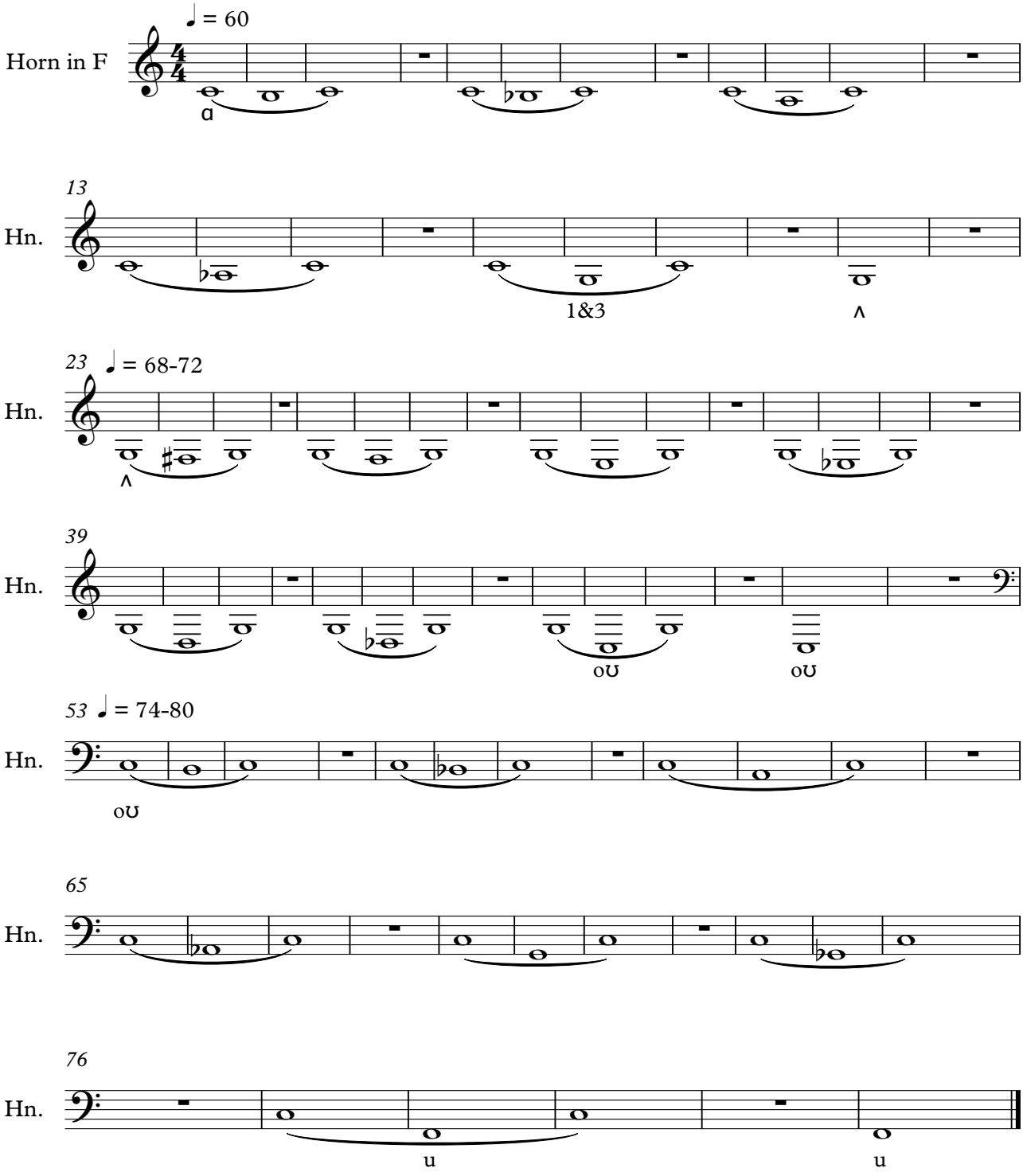
When playing these long tones:

- Set your metronome and a drone. For this, I suggest the TonalEnergy App, available on the iOS and Android market for only $3.99!
- Take relaxed, full breaths
- Pay attention to your tone and intonation. Strive for a characteristic sound!

Long Tones 1

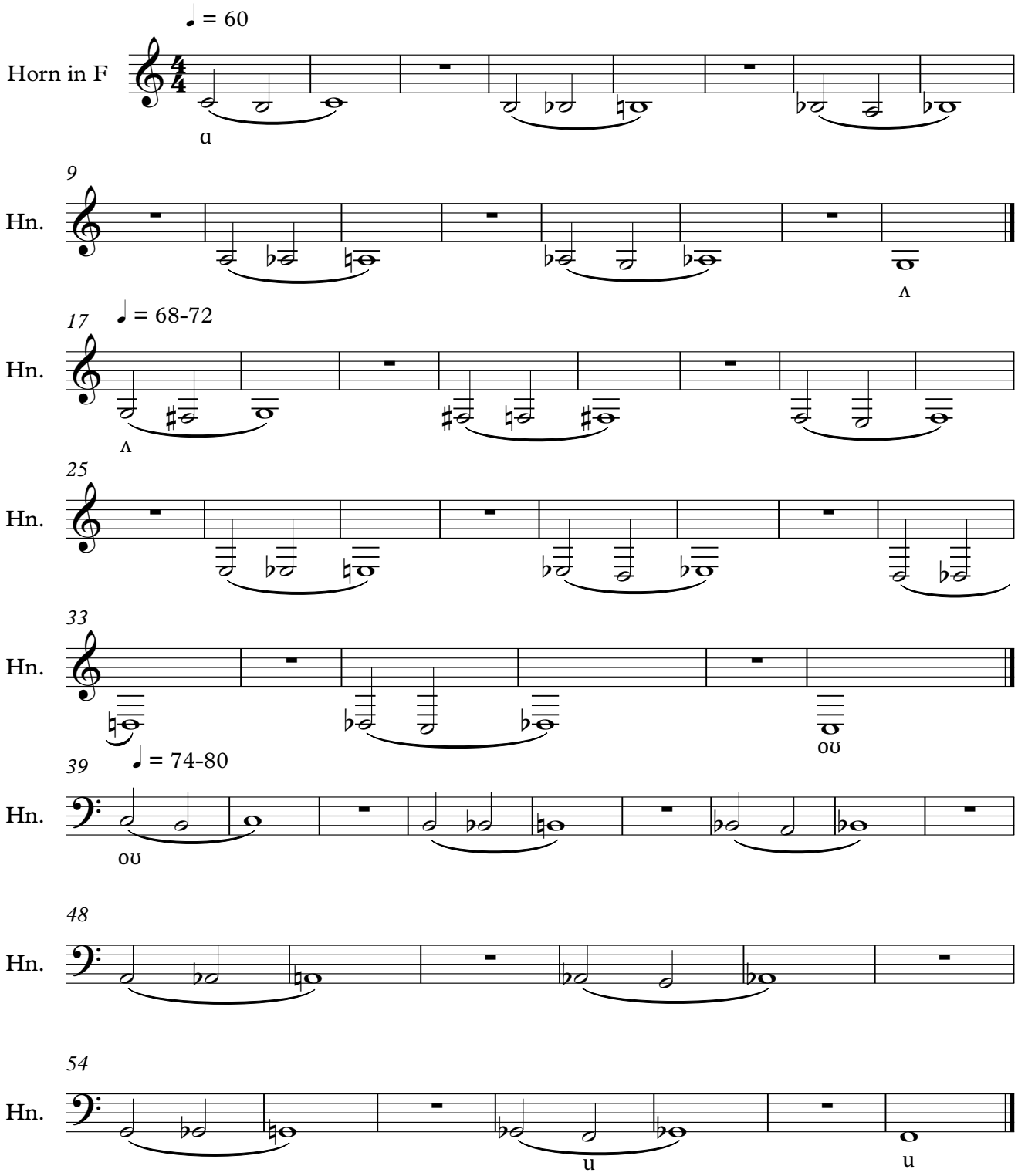
Each phrase should be played in one breath, adjust tempo if needed.
Fingerings should use the natural valve series: 0-2-1-12-23-13-123
Notice the vowel shapes indicated in the IPA
Strive for great tone, intonation, and breath control/support
Play these with a metronome and drone

Jon Holloway



Long Tones 2

Jon Holloway



Flexibilities:
Flexibilities, sometimes known as lip slurs, are an important part of the daily warm-up routine. They build great habits on your journey towards consistency and accuracy on the entire range of the horn!

When playing flexibilities, you should strive to use your vowels and consistent air to create efficient habits that rely on those skills.

Always use a drone and metronome when playing your flexibilities!

Jon Holloway's 5 Steps to Playing Flexibilities

Learning to play flexibilities can be simple! Just follow these five simple steps, and you will learn how to use your vowel shapes and air in an efficient way, as well as learn a new strategy for learning difficult passages in your etudes, excerpts, and solo music.

1. Sing flexibility on pitches with appropriate vowels.
2. Still using vowel shapes, half-whistle then whistle the slur.
    - If you cannot achieve either the half-whistle or regular whistle, use the one you can! They use the same techniques!
3. Articulate the slur. Play it very short. Make the vowel shape as soon as possible for maximum tone!
    - First articulate without the tongue, H+your vowel!
        i. for example, middle C would be Hɑ, or low g would be Hʌ
    - Then play the slur with very secco tongue articulations.
        i. For Example, middle C would be Tɑ or Dɑ, and low g would be Tʌ or Dʌ
4. Play the slur as a slur, remembering to be conscious of your vowel shapes and airflow!
5. Play the flexibility as an exercise. Start on the open partial and play it down to 12 and back up! (0, 2, 1, 12, 1, 2, and 0)
    - Remember that each vowel remains the same for each partial; that means that if third space c is eɪ, B, Bb, A, and Ab will be eɪ as well! This is the case because while on the same partial, pressing down a valve simply makes the horn longer, manipulating the pitch!

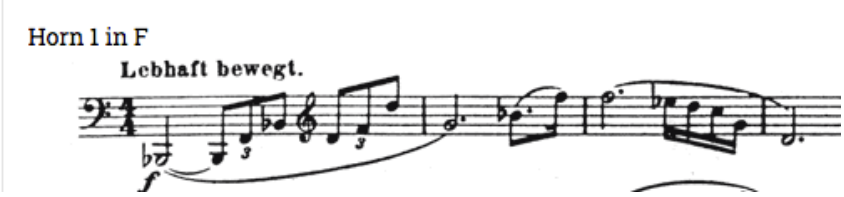
When Playing your flexibilities always keep in mind three things:

1. Constant airspeed and pressure
2. Smiley muscles are engaged
3. Consistent point of contact with the mouthpiece

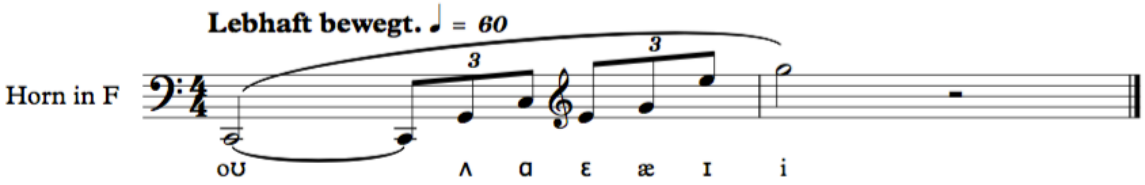
Many possible flexibilities can be found on the next page; however, I encourage you to only pick a couple of these per day and make up the third! Composing your own flexibilities can help you to become even more familiar and comfortable with the vowels on your way to complete mastery! When composing your own flexibilities, follow these simple rules:

1. Always start and end on the same note.
2. Don't skip partials
3. Break these rules sometimes when you are ready to create more and more difficult challenges!
4. Write flexibilities to practice difficult musical passages, for example if I am having a difficult time mastering the beginning of *Ein Heldenleben*, (and we all are!) I would do something like this:

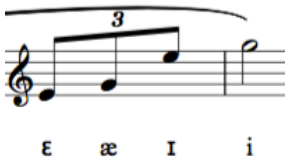
Original Strauss Excerpt:



Flexibility Exercise:



By playing this on the valve series to 12 and back again, you are able to get practice in the actual key (valve 1) as well as the keys around it. Start slow, and work to Strauss' tempo and you will have this excerpt down perfectly in no time!
If you find you need more specific practice, break down the whole excerpt into an individual two to three note exercises. For Example if I am having trouble moving through the second triplet passage, I will practice this:



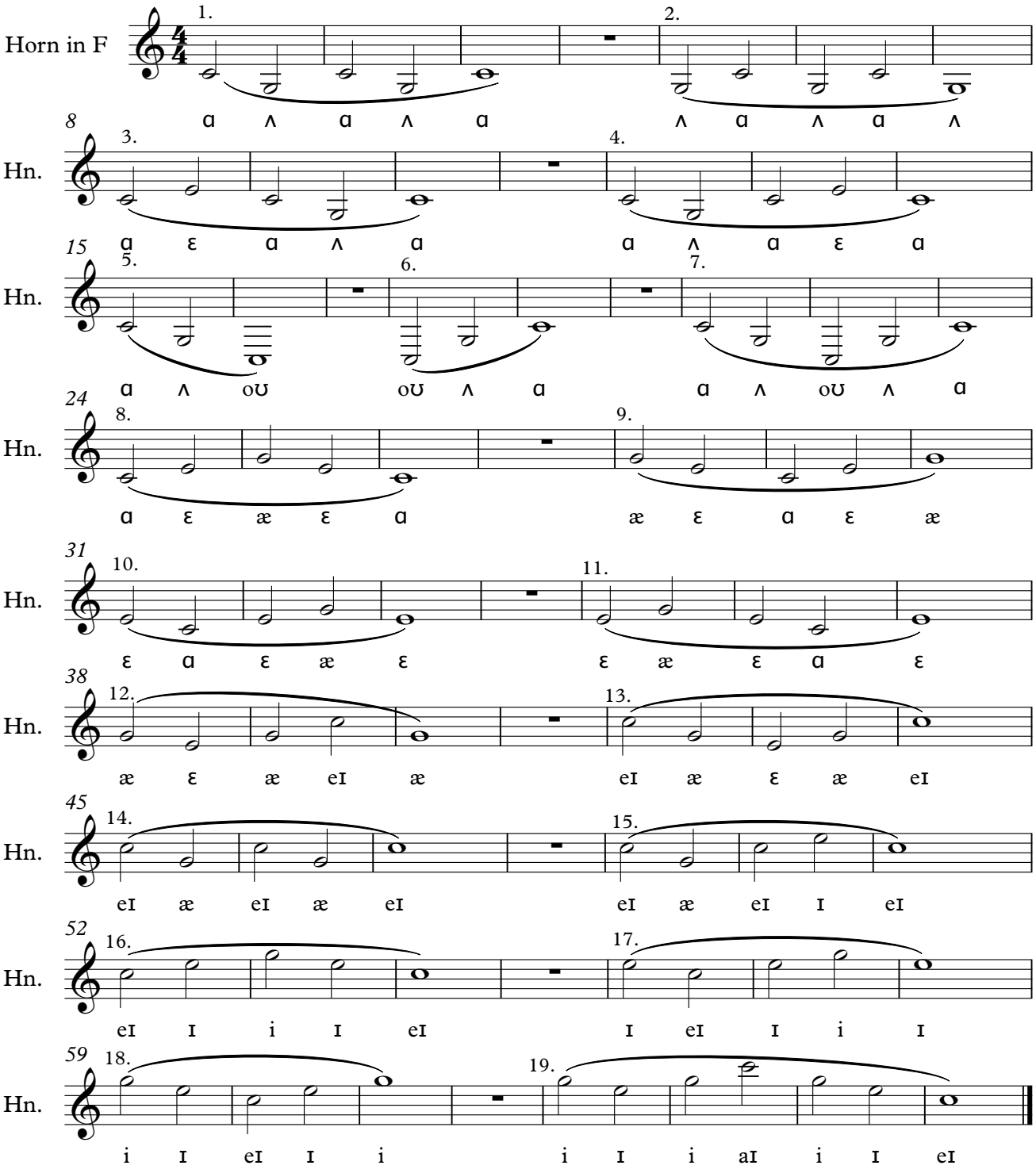
This 5-step process can and should be applied to the horn during all aspects of playing. Any difficult passage can be broken down to these simple steps. Start slow, and work your way to the marked tempo, building excellent habits along the way!

Remember to use your drone and metronome and enjoy your journey to becoming a great horn player!

Flexibilities

When playing these or any flexibilities, always follow the 4-steps.
Each slur should be played on each of the the series: 0,2,1,12, and back up to 0.
Strive for continuous air-flow and smooth transitions note-to-note.
Play at a comfortable dynamic and tempo. ♩ = appox. 60.
Students are encouraged to write their own flexibilities!

Jon Holloway



Articulation and Consonants:

Now that you have mastered your vowel shapes, you must learn to control the other part of your tongue!

The tip of the tongue acts independently from the body of the tongue, and is used to start and shape the initiation of a note.

For articulations, we use consonants, which helps to annunciate our vowels.

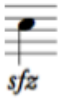
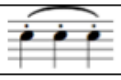
When we paint stripes on the wall, we need to have tape to define the line. This is what the tip of the tongue and our consonants do for the air.

There are many different types of articulations that we must master, but to do this we will almost always use [t] as in talk, or [d] as in dog. It is how the air acts upon these consonants that helps us to play soft and legato, heavy and loud, fast and short, or anything in between!

If you remember from the flexibilities, the goal in articulating is to get to the tone as quickly as possible. Remember that vowels are our life-long friends and consonants are merely passing acquaintances.

Types of Articulations:

Below is a table of the most common articulations and how to play them. Remember, they will often vary and will be ultimately defined by the style of the music!

Articulation	Marking	Consonant	Length	Air
Tongued		[t] or [d]	Full	Normal
Staccato		[t]	Separated, about ½	Normal
Legato		[d]	Full, smooth, and connected	Normal
Accent		[t]	Full	Weighted
Marcato		[t]	Heavy and separate, about ¾	Heavy
Sforzando	 *sfz*	[t]	Varying	Sudden weighted accent
Portato		[d]	Full and connected	Pulsed

Articulation Exercise:

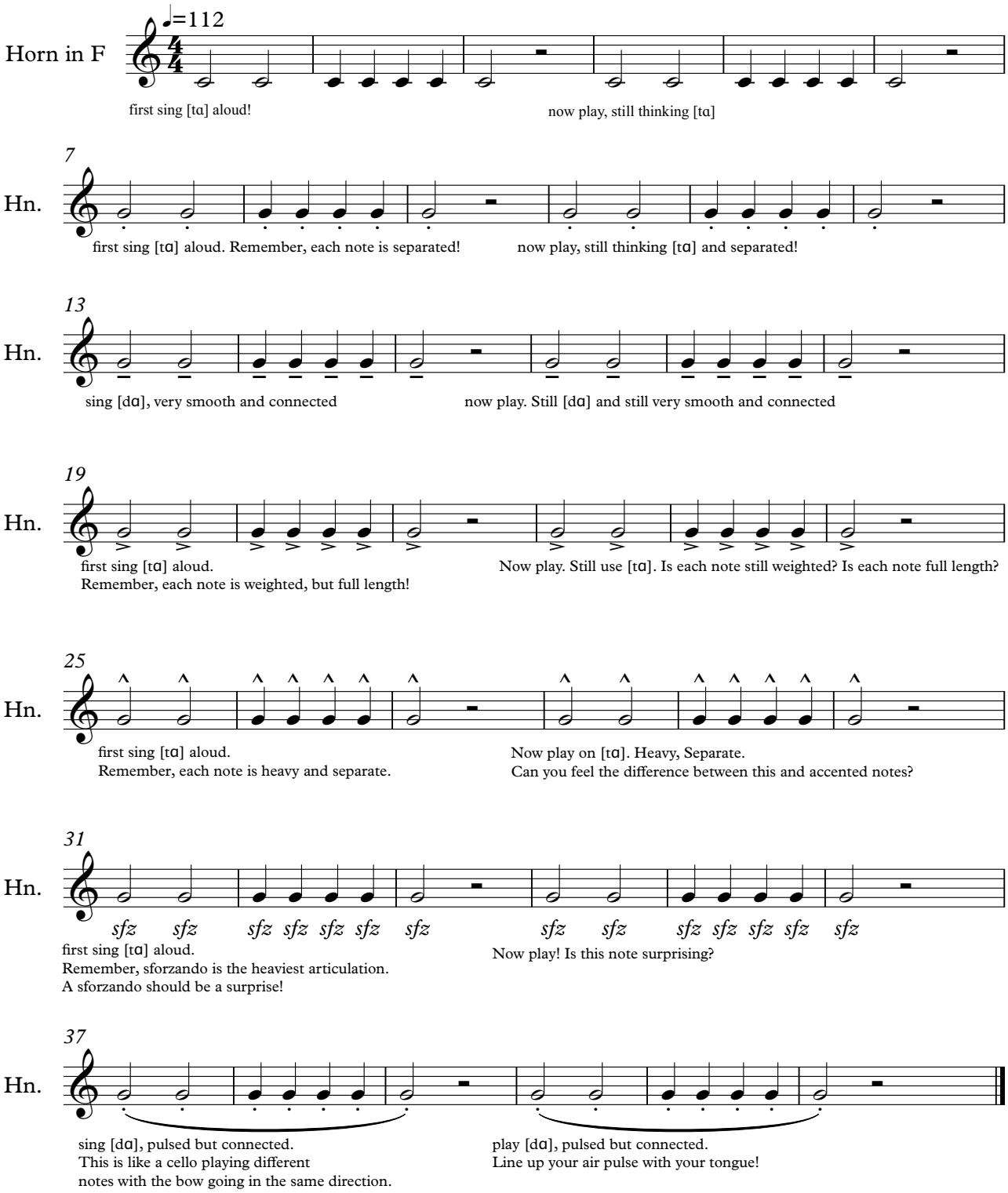
When playing this exercise, be sure to have your drone and metronome running!

Play this exercise in a variety of keys and dynamics, so you can build comfort in articulation on all ranges of the horn.

Articulations

When practicing articulations, remember
consonants are passising acquaintances but vowels are life-long friends.
Strive to find tone as soon as possible.
Accents are created by weighting our air at the initiation.
Each exercise should be played with a drone and metronome and on a variety of pitches and volumes!

Jon Holloway



Appendix B
Body Mapping Resources

Body Mapping is a valuable resource for musicians of any level. This appendix will focus on a short list of resources horn players can turn to in order to better develop their kinesthetic sense and personal body map. By developing their body map, horn players will be able to free the structures of their bodies, and consequently their movements. By having an understanding of how they can use their bodies efficiently performers may decrease excess tension. Without freeing the body to eliminate excess tension, horn players may face injury and adverse effects to their tone, intonation, range, and more.

F.M. Alexander, *The Use of the Self*, Orion Books, London, 2001

Alexander's book serves as a history of the development of the Alexander Technique, as well as an idea of how those techniques can be used while performing, speaking, or moving. The book provides several cases of various people who are able to use these techniques in their every day lives.

Barbara Conable, *How to Learn the Alexander Technique: A Manual for Students,* Andover Press, Portland, Oregon, 1995.

This book by Body Mapping creator Barbara Conable focuses on the Alexander Technique and it's relation to Body Mapping. Conable focuses on the structures and movements of the body and provides examples of how they can relate to performers in many different disciplines.

Barbara Conable, *What Every Musician Needs to Know About the Body*, Andover Press, Portland, Oregon, 2000.

This book is designed to teach musicians specifically about the structures and movements of the body and how that knowledge can be applied to the body map. This book has many helpful illustrations that show the movements and structures specifically with friendly reminders of how those structures are put together or how they move. Through reading this book, a performer or student will have a good idea of not only what Body Mapping is, but also how to apply it to their daily practice.

Barbara Conable, *The Structures and Movement of Breathing*, GIA Publications, Chicago, Illinois, 2000.

Conable's book on breathing is a short manual designed to be used as a resource for choirs. Although written as a resource for vocalists, the information of the breathing apparatus is directly applicable to brass playing. Horn players may also find the information in this manual helpful for regulating an efficient breath while keeping the neck, skull, and jaw free from excess tension.

Melissa Malde, MaryJean Allen, and Kurt-Alexander Zeller, *What Every Singer Needs to Know About the Body, 2 ed.,* Plural Publishing, San Diego, California, 2013.

Although this book is not written for horn players, brass players, or even instrumentalists, it is an excellent resource to understand how the ideas of Body Mapping can specifically relate to playing the horn. Vocal pedagogy relates to the understanding how to breathe efficiently, free the neck, and relax the embouchure to allow for efficient vowel and consonant production.

David Nesmith, *The Breathing Book*, Mountain Peak Music, Flagstaff, Arizona, 2011.

David Nesmith's book on breathing is the lone horn-specific resource on Body Mapping. While the focus of this book is on the structures and movements of breathing, Nesmith also focuses on the embouchure, balance, and some exercises horn players can use to eliminate excess tension in the breathing process.

David Vining, *What Every Trombonist Needs To Know About the Body*, Kagarice Brass Editions, Dallas, Texas, 2008.

Although this book is written for trombonists, there is a lot of information that is relevant to all brass players, such as how information on breathing, balance, embouchure, warming up, and more. This book includes detailed descriptions, illustrations, pictures, and more, allowing the reader to gain a solid understanding of the included information.

Appendix C
Research Interviews

During the research process for this document, electronic interviews were sent to many of the professional horn players and collegiate horn teachers in the United States and abroad. The responding performers and professors were given the option to do so via e-mail or over the phone. Their responses were recorded and used in this document. The questions and informed consent form of these interviews can be seen below.

Interview questions:

Is singing part of your daily practice?

- Why or why not?
- Does singing help your musicianship? i.e., interval training, pitch training, tone quality, phrasing, expression, etc.
- Do you play vocalises? (Bordogni or Concone)
- Do you do breathing exercises?
    - If so, do you use a system already created (i.e., Breathing Gym) or something else?

Have you studied singing or vocal techniques (i.e., college classes, singing in choir, voice lessons)

- If so, has that influenced the way you approach playing the horn?
    - How?
- Has it influenced the way you teach the horn?
    - How?
- What specific techniques from your vocal background to you bring to playing and teaching the horn?

Is singing part of you daily teaching?

- Do you encourage students to sing?
    - How?
- Do you sing with students in their lessons?
    - Do you find that students can be shy when singing?
        - What do you use to get them to be less self-conscious about singing in their lessons?
- Do you use vocalises (Concone or Bordogni)?
    - What do you hope your students take away from playing these exercises?
- Do your students do breathing exercises? (i.e., Breathing Gym or anything else)?
    - What effect do you think this has on your students?

Do you use vowel shape when playing/teaching?

- Which vowels do you use for which pitches? Why?
- Are there any techniques you use to help your students understand these vowel shapes
- Are you familiar with the IPA? Do you use the IPA when teaching or using vowels?
- Do you use a vowel shape while inhaling?
    - Does this change depending on what vowel shape you will be using on the exhale?

Are you familiar with Body Mapping, Feldenkrais Method, or the Alexander Technique?

- Is knowledge of human anatomy helpful while playing the horn?
- How does having this knowledge help your playing?
- Do you use these methods in your teaching?
- At what age or level do you think is a good time to start implementing these methods?

Do you use any sort of physical activity in your daily routine?

- Does this help your playing?
- What specific exercises do you use daily?
- Have you ever used yoga to increase your relaxation, physical shape, or breathing?

UNLV

INFORMED CONSENT

Department of Music

TITLE OF STUDY: A Vocal Approach to Horn Pedagogy

INVESTIGATOR(S): Lisa Bendixen, Jon Holloway

For questions or concerns about the study, you may contact Jon Holloway at **775-220-1204.**

For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted, contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll free at 877-895-2794 or via email at IRB@unlv.edu.**

Purpose of the Study

You are invited to participate in a research study. The purpose of this study is to investigate the connection between horn and vocal pedagogy in order to find a more efficient approach to playing the horn.

Participants

You are being asked to participate in the study because you fit this criteria: Professional Musician and/or Teacher.

Procedures

If you volunteer to participate in this study, you will be asked to do the following: Participate in an online interview.

Benefits of Participation

There may be direct benefits to you as a participant in this study. However, we hope to learn if there is a more efficient approach to playing the horn through the connection of vocal and horn pedagogical techniques.

Risks of Participation

There are risks involved in all research studies. This study may include only minimal risks, For example, you may become uncomfortable answering some of the questions.

Cost /Compensation

It is anticipated that there will not be financial cost to you to participate in this study. The study will take 1-2 hours of your time. You will not be compensated for your time.

Confidentiality

All information gathered in this study will be kept as confidential as possible. All records will be stored in a locked facility and data be stored in a secure cloud server at UNLV in CEB 331 for one year after completion of the study. After the storage time the information gathered will be deleted/destroyed.

Voluntary Participation

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with UNLV. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Participant Consent:

I have read the above information and agree to participate in this study. I have been able to ask questions about the research study. I am at least 18 years of age. A copy of this form has been given to me. Please, print, sign, and scan this page and return it along with your interview answers to jonholloway@sbcglobal.net.

_____ _____

Participant Name Date

_____

Participant Name (Please Print)

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Curriculum Vitae

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