

University of Cincinnati

Date: 9/30/2011

I, Noel A Garcia , hereby submit this original work as part of the requirements for the degree of Doctor of Musical Arts in Bassoon.

It is entitled:

The Ergonomics of Playing Bassoon: A Natural and Stress Free Approach to Playing the Instrument

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The Ergonomics of Playing Bassoon: A Natural and Stress Free
Approach to Playing the Instrument

By

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Bassoon Performance

B.M. University of California in Los Angeles, 2003

M.M. University of North Texas, 2005

A Document Submitted to the Faculty of the College
Conservatory of Music In Candidacy for the Degree of
Doctor of Musical Arts

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Cincinnati, Ohio

October 2011

Abstract

This document explores the most common problems and challenges related to posture, weight distribution, and hand placement faced by beginning and advanced bassoon players. Eleven professional bassoonists who play with some of the top orchestras in the country shared their knowledge and experience dealing with the instrument's complex ergonomic challenges. Solutions to these challenges were also researched and gathered from sources dedicated to instrumental playing, such as guides for teaching instrumental playing, medical sources concerned with the performing arts, and method books available to the students. This project analyzes and explains in greater detail the postural habits that players develop from the time they first hold a bassoon, in the process exploring how these commonly found habits hinder bassoonists from an ergonomic, technical, and biometric perspective. Understanding the importance of practicing good posture can be the difference between tension-free, consistent and technically proficient playing and hitting a wall to no avail.

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Special thanks to William Winstead for making this project possible and to all the excellent bassoonists who enriched this project with their time and knowledge.

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Introduction

The ergonomics of playing bassoon explores the way we approach the instrument, from the embouchure to the way we sit or stand and hold the bassoon. The importance of ergonomics for instrumentalists has gained awareness in the last few decades through the field of performing arts medicine and through systems like Alexander Technique and Feldenkrais Technique. This study does not focus on new ideas but explores ideas and solutions successful bassoonists already employ to solve the bassoon's many ergonomic challenges.

Developing good ergonomics is not only a healthy and proficient way to approach playing an instrument but it is also an important part of how audiences perceive us as performers and musicians. It can often be distracting and even unpleasant to watch an instrumentalist perform with an awkward posture and uncontrolled tension. On the other hand, a natural and relaxed posture is conducive to good performances and good stage presence.

Although physiological differences among players can be an important reason behind the many different holding positions among bassoonists, it is perhaps the solutions employed by some of the most talented bassoonists to overcome the ergonomic challenges of the instrument where the key to good and efficient ergonomics can be found. As David McGill points out, understanding the ergonomics of playing bassoon is the secret of successful players.

General comments

To explore the ergonomics of playing the bassoon eleven bassoonists and teachers as well as nine students were interviewed for this document. The professional bassoonists interviewed for this project are: William Winstead, Martin James, Shawn Mouser, Michele Grego, Barrick Stees, David McGill, William Buchman, Carol Aufmann, Elizabeth Burkhardt, Carl Nitchie and Juan de Gomar. The participants answered a questionnaire, some measurements were taken of their hands, and they were photographed playing in the sitting and standing positions.

Relevant practices of each individual approach are described throughout the sections of the document. The approach of each individual player may differ significantly from one to the other providing contrast for analysis and comparison. All different styles discussed in the document are used successfully in the highest levels of performance.

A student guide is also included at the end of the document. The guide explores some popular instrumental guides written for music educators and beginning students. The guide is intended to introduce beginning students to the instrument's ergonomic challenges and to some available solutions. Raising awareness of the instrument's ergonomic challenges from an early stage in students' development can be the key to a joyful and gratifying learning experience.

Holding the bassoon starting with the embouchure

Finding the best position of the bassoon and the bocal so that the reed comes in the mouth's cavity at the right angle can be difficult. Changing the angle of the bocal and reed frequently produces a chain reaction that affects all aspects of holding the instrument, including the way the bassoon rests on the right thigh, how it balances and the position of the arms and hands.

Traditionally an embouchure with a slight overbite is common. This embouchure is easily produced when the bocal and reed approach the mouth's cavity horizontally or with a slight upward direction. Martin James believes that the best approach to producing the "normal" embouchure is not to alter the natural position of the jaw when holding the reed (the jaw is in its natural position when it is not pushed out of its hinge). He has found that altering the position of the jaw affects the throat opening and causes tension. However, Mr. James finds that occasionally when approaching extreme dynamics and registers the natural position of the jaw can be modified to produce the desired sounds.

The "normal" playing embouchure for all bassoonists is dependent on their facial and jaw structures. Mr. James points out that William Waterhouse, who had a natural prominent overbite and Eli Carmen, who had a prominent jaw, had very different embouchures and both were successful bassoon players.



Image 1: Martin James finds the right embouchure can be achieved when the jaw is in its natural position on its hinge. The bocal and reed should approach the mouth's cavity horizontally or with a slight upward direction.

Carl Nitchie has a traditional approach to producing a good embouchure. He explains that although theoretically an embouchure that is similar to that of other double reed instrumentalists (like an oboist's embouchure which naturally makes the reed point to the palate because of the way the instrument is held) could be ideal, better control of the bassoon reed is achieved with a slight overbite. When looking at Mr. Nitchie holding his instrument the position of his face in relation to the reed and bocal slightly accentuates his overbite embouchure. An overbite embouchure allows him to put more pressure on the upper blade so he plays his reeds with the hardest blade up.



Image 2: The almost horizontal direction of the bocal allows Carl Nitchie to play with an overbite embouchure. The unmodified bend of German bocals have a natural downward direction when placed on a flat surface. The bend of German bocals keep the instrument at a higher plane making the elbows bend more.

Mr. Nitchie holding position keeps the boot joint close to his hip and the bocal and reed in an almost horizontal position. When the bocal and reed have a horizontal position an overbite embouchure is favored. This embouchure allows Mr. Nitchie to choke and dampen the reed easily when necessary (see section on overbite and symmetrical embouchures on page 24).

David McGill on the other hand has a less traditional approach to forming his embouchure. He considers the embouchure to be the most important aspect of his approach to holding the instrument correctly. Mr. McGill developed his holding

position based on an idea that was originally put forth by Mark Popkin from the Glickman-Popkin bassoon camp. His idea is based on an observation of German bassoon players and how they suspend and hold their instruments.

It is common for German bassoonists to suspend their bassoons using a neck strap or shoulder harness rather than a seat-strap as is common among American bassoonists. These two methods of suspending the instrument often produce different holding positions including a different direction in which the reed enters the mouth's cavity. When the bassoon is suspended with a neck-strap or shoulder harness, the bell naturally tips forward and the boot joint slides back closer to the player's hip. Because most of the instrument's weight is above the point of suspension (the place where the neck-strap or shoulder harness attaches to the strap ring or balance hanger) the tendency for the instrument to tip forward pushes the boot joint back toward the hip and makes the bocal and reed have an upward direction when approaching the mouth.



Image 3: Suspending the bassoon with a shoulder harness in the sitting position. The inclination of the instrument, having the boot joint closer to the hip, allows the bocal to have a pronounced upward direction. The position of the right arm and elbow, resting further back than when suspending the instrument with a seat strap is common with this method of suspension. The bassoonist in this picture is using a Heckel balance hanger. European players often prefer this method of suspension.

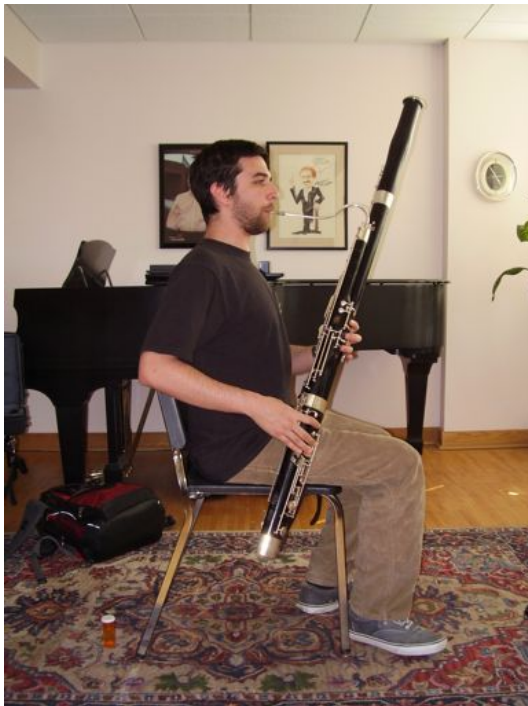


Image 4: Suspending the bassoon with a seat strap in the sitting position. The position of the instrument is usually straighter than when suspending the instrument from the strap ring, making the direction of the bocal almost horizontal.

When the bocal and reed point upward the direction of the reed in the mouth's cavity is closer to the palate making the way that the lips hold the reed's upper and lower blades more symmetrical.

Since most bassoon players have a natural overbite a more symmetrical embouchure is achieved when the reed's direction in the mouth's cavity is pointing up to the palate, consider the following embouchures:

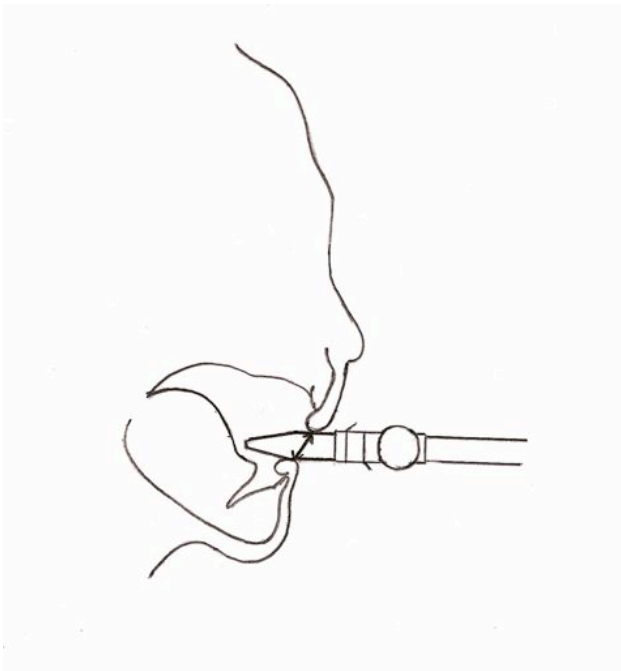


Image 5: When the reed approaches the mouth's cavity with a perpendicular angle the upper and lower lips contact the blades at different places.

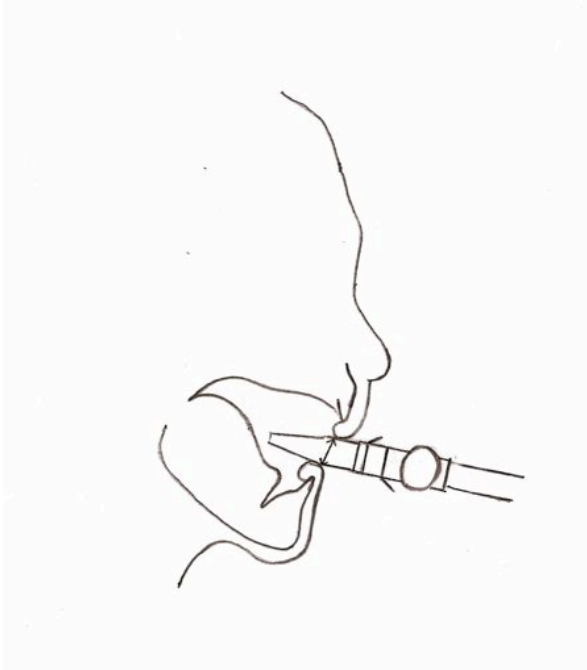


Image 6: Giving the reed a slightly upward direction in the mouth's cavity allows the lips to touch the reed's blades more evenly.

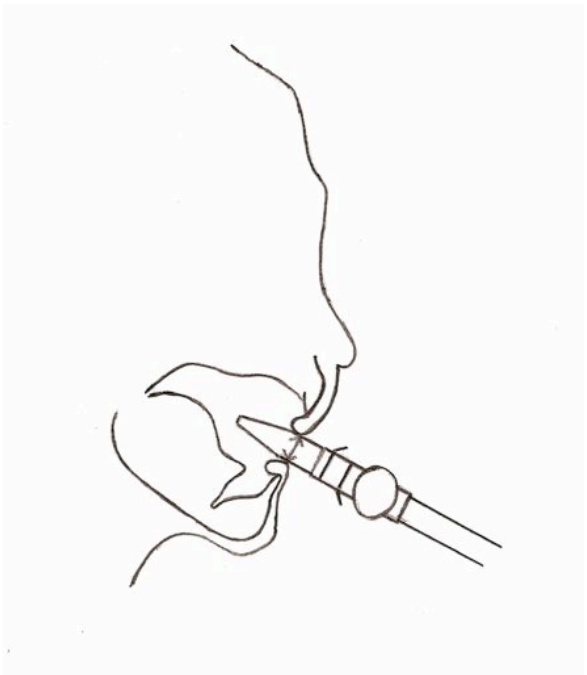


Image 7: When the tip of the reed points towards the palate the upper and lower lips can hold the reed's blades at the same place making the embouchure symmetrical.

When the reed comes into the mouth's cavity pointing to the palate it enables the player to touch the reed at the same place on both blades resulting in a reed that

vibrates more symmetrically. When the reed's blades vibrate equally the reed becomes balanced and easier to play in tune. Mr. McGill illustrates this effect by holding his bocal with a reed fixed on it and playing the reed while slowly moving the bocal down starting from a position where the bocal and reed are entering the mouth's cavity in a horizontal position (pointing straight into the mouth's cavity) and finishing with the bocal and reed pointing up to the palate. He stops moving the bocal down when he feels his embouchure is touching both blades on the same place (playing the reed on the bocal starting on the position illustrated on image 5, moving the bocal down until the embouchure on image 7 is achieved) The resulting sound of this illustration is one that starts smaller and higher pitched, and gets bigger and lower as the bocal moves down. The biggest and lowest sound is achieved when the embouchure touches the blades on the same place when the bocal reaches the lowest position.

Changing the method of suspending the bassoon from a seat-strap to a neck-strap or shoulder harness to change the direction of the reed in the mouth's cavity can change drastically the way a player balances and holds the instrument. Suspending the bassoon with a seat-strap prevents the boot joint from freely moving back or forward on the player's thigh. This can be helpful when balancing the instrument as the seat-strap can create a counter-pull that can help the player relieve hands and arms from some of the weight created when holding the bassoon with the bell slightly tipping forward.

However, in order to get a symmetrical embouchure while using a seat-strap the bassoonist is required to tip the instrument forward even more putting more weight on the left arm and hand. Mr. Popkin's solution to this is to bend the bocal so that the end where the reed is fixed points up when holding the bocal as if fixed on a bassoon in a vertical position. The following picture illustrates Mr. McGill's preferred bocal that he has used for over twenty years.



Image 8: The bend of David McGill's bocal points slightly upward when placed on a flat surface. This allows him to balance the instrument in an almost vertical position when using a seat strap.

Bending the bocal has allowed Mr. McGill to balance the bassoon so that he can take his hands off the bassoon while in playing position without the instrument moving at all. As a result his arms, hands and fingers are relaxed and move freely without the tension produced by constantly supporting the bassoon.

The late Mark Popkin influenced many bassoonists with his symmetrical embouchure approach including Barrick Stees, Bill Buchman, Dennis Michel, David McGill and other successful bassoonists. Through the Glickman-Popkin bassoon camp Mr. Popkin reached many young bassoonists for over three decades. He was in fact asked by hundreds of bassoonists for help bending their bocals.

The procedure he used for bending the bocal is simple and does not require any tools. It consists of holding the bocal rubbing it slightly until it feels warm as the hands. When the bocal feels warm it can be carefully bent. Holding the bocal with both hands and both thumbs placed on it, pressure is applied stopping when the bocal "gives" slightly. The same procedure is repeated on different parts of the bocal starting from about an inch and a half from the end where the reed is fixed to about an inch before reaching the highest point after which it curves down into the instrument (image below). The bocal is placed on a table or other flat surface to measure the degree of the bend every time after the bocal gives slightly to the applied pressure. Mr. McGill and Mr. Popkin have never had a bocal ruined while bending it as just described above.

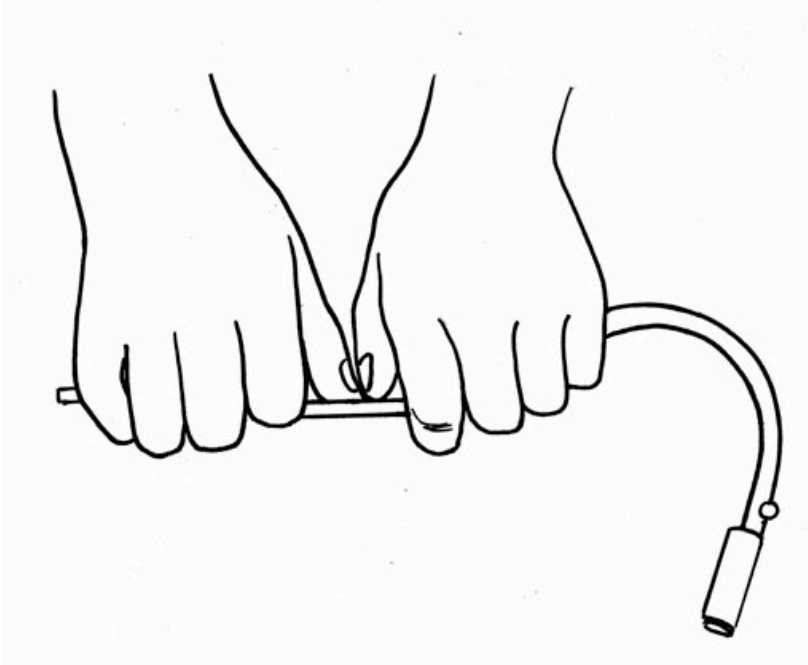


Image 9: Bending the bocal allows the player to play the bassoon at a more vertical position. Mr. Popkin has bent hundreds of bocals.

Holding the instrument in a more vertical position may affect sound projection. The bell joint plays an important role in defining the instrument's timbre and volume.¹ Pointing the bell joint straight up while playing might limit sound projection, however, projection is also highly dependent on the acoustic properties of a specific hall. For this reason acoustical studies on the instrument have been conducted in anechoic chambers.² The optimal holding position to maximize sound projection in concert halls might vary from hall to hall.

William Buchman plays with the Chicago symphony and is also a strong proponent of using a symmetrical embouchure. Mr. Buchman holds degrees in physics and explains that the benefit in sound and response from an embouchure

¹ Will Jansen, *The Bassoon: Its History, Construction, Makers, Players and Music*,
² Paul R. Lehman, *The Harmonic Structure of the Tone of the Bassoon* (Seattle: Berdon Inc., 1962), iv.

that touches both blades at the same place is due to the blades vibrating together in concert. He explains that when the reed is not symmetrical or the embouchure touches the blades of the reed on different places some of the reed's vibrations end up canceling each other producing less sound and response. Generally, the embouchure has a dampening effect on the reed's four-phase vibrational cycle. This dampening effect is increased when the lips touch the blades closer to the tip, where the blades travel the most as they vibrate.³

Looking at the pictures below it is clear that Mr. Buchman's setting allows him to have the same reed direction in the mouth's cavity as someone suspending the instrument with a neck-strap. He also uses a bungee cord that attaches from the back of the chair to the bassoon's strap ring to relieve the left hand and arm from the weight of the instrument. Mr. Buchman uses the bungee chord in combination with a seat strap when he practices and when he rehearses and plays with the orchestra.

³ James B. Kopp, "Physical Forces at Work in Bassoon Reeds," *International Double Reed Society* vol. 26 no. 2 (2003): 76-79.



Image 10: William Buchman playing on a bocal with a modified bend. The upward direction of the bocal and reed is also the result of the inclination at which the instrument is held. The instrument is suspended with a seat strap and a bungee cord that attaches to the back of the chair and the instrument's strap ring.

Barrick Stees believes that the optimal angle for the reed is achieved when it enters the mouth at a ninety-degree angle to the face. Mr. Stees' bocal is bent so that when it is placed on top of a flat surface the end that holds the reed is parallel to the flat surface (not quite as bent as Mr. McGill's bocal illustrated in Image 8 on page 17). Although he did not specifically mention the importance of a symmetrical embouchure or one with an overbite, pictures of him holding his instrument show that his reed and bocal have a clear upward direction inside the mouth's cavity. Mr.

Stees finds that having a flexible approach to the embouchure can be a powerful tool allowing for greater control of the intonation, dynamics and register.



Image 11: Barrick Stees also uses a bocal with a slightly modified bend. This image shows the slightly upward direction of the bocal and reed.

Bending the bocal has allowed Mr. Stees to relax his jaw and arms. Bending the bocal raises the height and direction of the reed allowing the player to hold the bassoon lower. Like playing with an English bend bocal, as the one used by William Waterhouse, raising the height and direction of the reed by bending the bocal allows

the player to keep the elbows straighter and the arms more neutral and relaxed. This is especially helpful for tall players with long hands and arms.



Image 12: Mr. Waterhouse playing a Heckel bassoon fitted with a spike and an English bend bocal. The elbows and overall position of the arms are more relaxed.

William Winstead prefers considerable flexibility in the formation of his embouchure. The bocal always enters the mouth with some degree of upward angle but his embouchure utilizes both the overbite and the non-overbite (symmetrical) concepts, sometimes also referred to as soft-cushion and hard-cushion embouchures. The non-overbite embouchure moves the lower jaw forward from its hinge so that the teeth are no longer staggered and the lips touch the reed at the same point. Winstead points out that the “crow” of the reed is extremely important to him with regard to several aspects of playing, and that the embouchure which

produces the “best crow” – one with at least three pitches – is without question the non-staggered embouchure.

Mr. Winstead utilizes the overbite embouchure for softer and more sensitive passages, employing the dampening factor for control. Variation in the amount of the lips exposed is also employed for pitch control. The non-staggered or less-staggered embouchure is utilized when louder dynamic and increased projection is needed.

For the extreme upper range Mr. Winstead uses a further exaggerated version of the non-staggered embouchure in which the lower jaw is pushed even further forward, imitating a slight underbite. Along with this exaggeration the corners of the mouth are also pulled back as if trying to smile. The resulting embouchure closes the tip opening of the reed enough to allow the higher partials (which are responsible for the production of these pitches) to be selected with considerably more ease.

Overbite and symmetrical embouchures

A good embouchure should allow excellent control of the reed in order to have good intonation throughout the instrument's registers and to play a wide range of dynamic levels. Depending on the embouchure, a different approach is necessary to achieve the desired reed control. A reed that plays fine with an overbite embouchure may feel hard or may have an excessive tip opening when played with a symmetrical embouchure. Adjusting the reed may not be the only solution.

Since a reed's blades often get thicker as they get closer to the first wire, playing a reed close to the first wire can make it feel more resistant and harder to control. Playing a reed closer to the tip on the other hand, allows the player to "choke" the reed without much effort. Choking the reed unintentionally may be the result of having a tense embouchure or playing the reed too close to the tip where it is very weak and can cause intonation and response problems. Choking the reed can be helpful when playing softer dynamics, especially in the lower register when done with the proper embouchure and support.⁴

When playing with an overbite embouchure, while the upper lip is closer to the first wire, the lower lip is able to "choke" the reed by pushing, and slightly collapsing the lower blade. Since the lower lip is closer to the tip of the reed and slightly closing the jaw produces the pressure, choking the reed is actually very easy to do especially when the embouchure has a very pronounced overbite.

⁴ Ibid., 79.

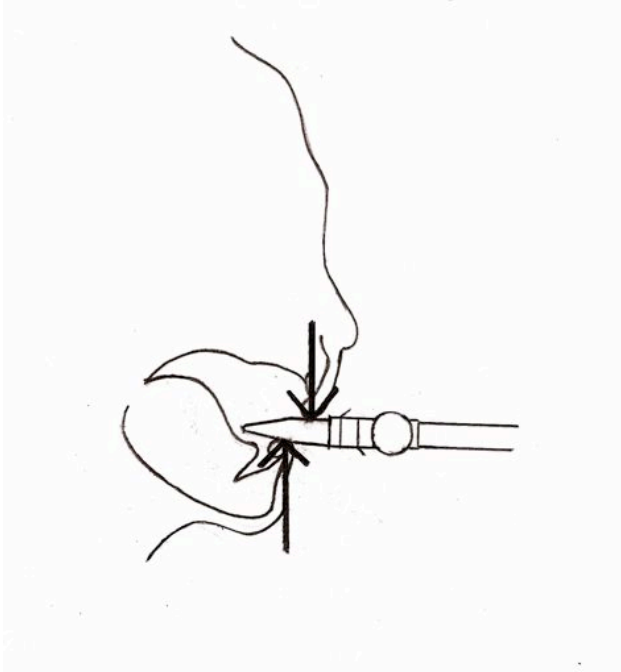


Image 13: Collapsing the lower blade with an overbite embouchure to choke the reed. Choking the reed is useful to play softer dynamic levels and to adjust pitch.

Playing with a symmetrical embouchure on the other hand, requires a different approach to control the reed. The reed might feel unresponsive when held close to the first wire. Since the lower lip is close to the first wire, as it is holding the reed at the same place as the upper lip, it cannot “choke” the reed easily as it is able when using an overbite embouchure. To achieve better control, the reed must be held at the appropriate position on the blades where the resistance of the blades allows the player to “choke” the reed without struggling. Generally, as a result it may appear necessary to hold the reed closer to the tip (with less reed in the mouth) to have good control using a symmetrical embouchure than would be necessary using an overbite embouchure. David McGill points out that he does not play close to the first wire as many bassoonists do.

Choking the reed using a symmetrical embouchure allows both blades to collapse equally (assuming the blades of the reed have a symmetrical scrape) when the jaw closes pushing the reed against the upper lip. Since the resulting pressure is applied on the same place on both blades, both blades collapse equally keeping the reed balanced.

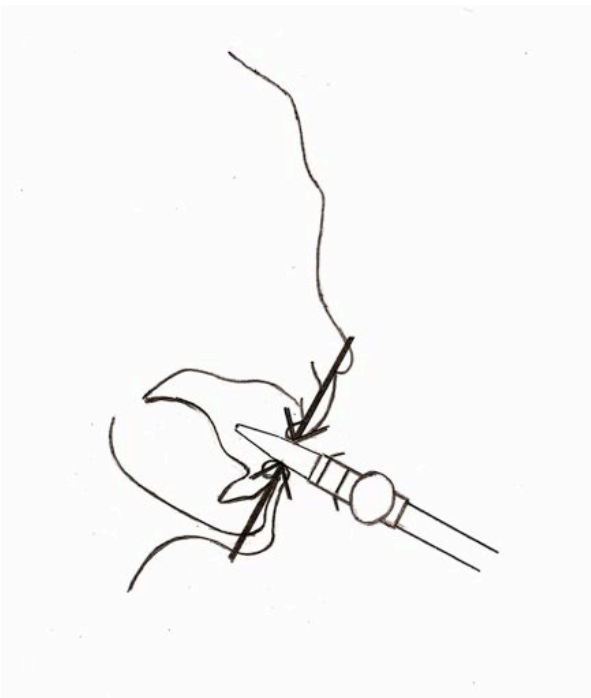


Image 14: Collapsing both blades by putting pressure on the reed with a symmetrical embouchure. The reed is kept better balanced when choked. The embouchure has less reed in the mouth for easier control.

Symmetry has also been a very important aspect of reed making for all methods and styles. From the way we gouge, shape and profile cane to forming and the reed's tip opening symmetry is a desired quality in most reeds.

The type of embouchure used may also affect other aspects of playing such as tonguing and the ability to relax the jaw. To produce a symmetrical embouchure the reed comes into the mouth's cavity with an upward direction, allowing it to be positioned close to the palate. This may in fact facilitate double-tonguing by allowing the tongue to contact the tip of the reed while staying closer to the palate and reducing the movement necessary to articulate with the reed and palate.

Regardless of the type of embouchure used, the jaw should be kept as relaxed as possible during playing and practice time. Chronic tensing of the jaw muscles is known to cause wear and tear in the temporomandibular joints.⁵ Setting up the reed's direction in the mouth's cavity allowing the lower lip to contact the blade on the right place can help avoid having to alter the natural position of the jaw (pushing out or pulling in the jaw to contact the reed at the desired place for better control depending on the embouchure).

Great control and flexibility are essential when approaching the embouchure. Learning how to place the lips on the reed's blades is not only helpful in dampening and choking the reed for softer dynamics but is also necessary to achieve the best resonance. With the right embouchure the lips and the reed vibrate together producing the best resonance.⁶

David McGill has found that using a symmetrical embouchure improves the intonation of the instrument in the most difficult registers. A symmetrical

⁵ William J. Dawson, "Ask the Doctor: A Mouthful of Problems," *International Double Reed Society* vol. 25 no. 2 (2002): 113.

⁶ Kopp, 79.

embouchure allows the lowest fifth in the instrument's register to be naturally flatter. It also helps the highest register by making the register from high B above middle C become flatter.

It is also interesting to note that Mr. Winstead's high register embouchure that he produces by pushing out the jaw changing the embouchure from a natural overbite to a slight underbite produces the effect of loading the reed's blades next to the collar (adding mass). The reed's blades do not collapse easily to jaw pressure when the pressure is applied closer to the collar. This allows Mr. Winstead to have a tighter firmer embouchure loading the blades without collapsing the tip opening. The effects of adding mass to the back of the reed (next to the collar) include lessening the compliance of the blades and increasing tension on the tip opening making it open and round (see pp. 22,23).⁷ Lowering compliance increases the reed's vibrating frequency.⁸

⁷ Ibid., 74.

⁸ Ibid., 71.

Balancing the bassoon

Apart from physiological differences among bassoon players, the ergonomic complexity of the bassoon has led bassoonists to adopt different holding styles and positions that are evident not only among bassoon students but also among professional bassoonists. Learning to manage the weight of the instrument to avoid injuries and to allow a greater degree of comfort and technical proficiency is a process that most bassoonists revisit often during their careers. Finding a holding position that alleviates tension without compromising other aspects of playing can be a very challenging task.

Elizabeth Burkhardt, who plays with the Atlanta Symphony, has developed a system through the use of several straps and a cushion that allows her to keep her bassoon in playing position without putting any static load on her hands. She has studied the ergonomics of playing bassoon through several systems including Body Mapping, Alexander Technique and Feldenkrais Technique. This has helped her learn to use her body as efficiently as possible.

A seat strap and a cushion placed on the right side of the chair support the bassoon's weight. Two other straps keep it from falling forward or to her left side. One of the straps attaches to the back of the chair and to the bassoon's strap ring, this strap keeps the bassoon from falling forward. The second strap is attached to the chair's front left leg and to the seat strap's cup. This strap keeps the bassoon from falling to the left side. She sometimes also uses a flat piece of wood to raise her feet about an inch or so from the floor providing support for her back.

Ms. Burkhardt feels that to have the best tone production the reed and bocal should come horizontally into the mouth's cavity. Pictures of her setup show her bocal and reed with a slight upward angle.



Image 15: Elizabeth Burkhardt playing in the sitting position using several straps to keep the bassoon suspended. This image shows one strap attached to the chair's front left leg.



Image 16: The bocal and reed approach the face in a perpendicular angle. Her face looks down and the bocal and reed have an upward direction.



Image 17: The bassoon rests on a black cushion placed on the chair. Through the use of straps and this cushion the bassoon stays in place without putting any pressure on the hands and arms.

This playing setup has allowed Ms. Burkhardt to play without any tension in her hands and arms and to slide her left hand on the long joint to avoid stretching as she plays.

David McGill has also developed a setting that allows him to have his bassoon in playing position putting no static load on his hands. When he was seventeen years old, before he learned to balance the bassoon without the need to support it with either hand, he felt that the instrument's weight was putting too much static load on

his left hand causing his index finger to become numb. After reading an article in the IDRS Journal he became convinced that the left hand should not support the instrument's weight. The article showed that supporting the weight of the instrument with the left hand can cause compression of the radial neurovascular bundle of the index finger and can lead to numb and tingling fingers. This compression to the nerve bundle can be discomforting at first but can lead to permanent damage if not corrected.⁹

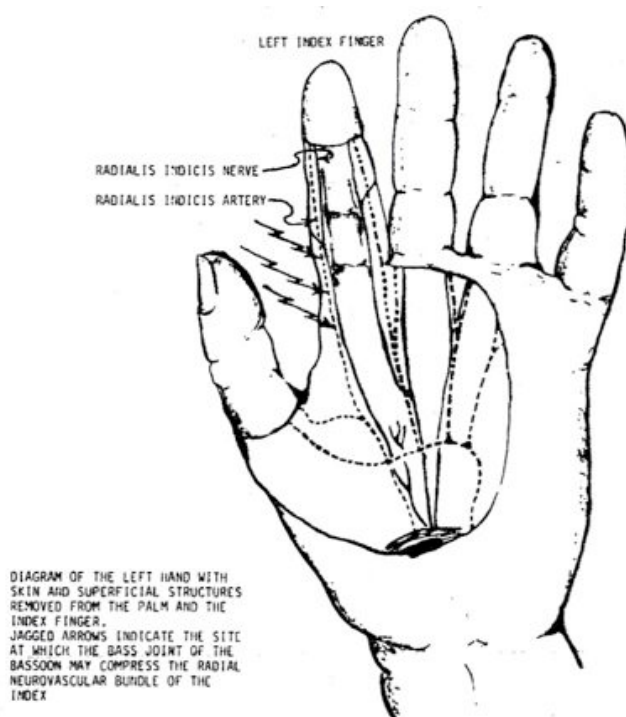


Image 18: Copied from the IDRS Journal. This image shows the radial neurovascular bundle of the index finger. To avoid potential injury the instrument's weight should be kept from compressing this nerve bundle.

⁹ Chester W. White, "Painful Left index Finger, An Occupational Hazard for Bassoonists," *International Double Reed Society* vol. 2 no. 3 (1979): 4.

His setting does not require any additional straps or attachments. Using only a seat strap Mr. McGill is able to find the point where the instrument balances perfectly on his thigh. To do this he rests on the back of the chair and brings the instrument towards him. As he pulls the instrument back towards him, the bassoon comes close to a vertical position (when looking at Mr. McGill's setting from the right side) it stops pulling forward and becomes balanced.



Image 19: David McGill using a seat strap and balancing the bassoon in an almost vertical position. This allows him to keep the instrument from pulling forward.



Image 20: The modified bend of David McGill's bocal allows him to hold the instrument almost vertically while keeping the bocal and reed with an upward direction in the mouth's cavity.

However the instrument might still pull to the left or right when looking at the setting from the front. Mr. McGill is able to keep the instrument from pulling to either side by moving the instrument in the direction contrary to the pull until it becomes balanced. This is in fact the key to developing a good posture when playing bassoon.¹⁰ A balanced posture keeps away unnecessary tension by utilizing the least amount of muscles and effort.

If the thigh contacts the boot joint closer to the long joint the instrument will likely pull to the right (from the player's perspective). When the thigh contacts the boot joint at a lower point or away from the long joint the instrument will most

¹⁰ William J. Dawson, "Ask the Doctor: Is Posture Really That Important?," *International Double Reed Society* vol. 33 no. 4 (2010): 149.

likely pull to the left. Depending on whether the bassoon pulls left or right, to find the balance point slowly move the bassoon in the opposite direction of the pull until it balances. Once the bassoon has been balanced in both directions (back to forward and left to right) the bassoon should stay in position without the need to hold it.



Image 21: This image shows the inclination of the instrument from the front. When the instrument is held with less inclination it can be balanced on the right thigh. Keeping the right foot flat on the ground can give the right thigh more elevation making it a better surface to balance the instrument.

Using the chair's back support and perfectly balancing the bassoon has allowed Mr. McGill to be completely relaxed as he holds his instrument. He does not believe that holding the instrument in a way that produces muscular tension (such

as constantly supporting the weight of the instrument with either hand) can be conducive to a good posture. He explains that supporting the weight of the instrument with the hands and arm and not using the back support of the chair is like leaving an unnecessary electric current turned on. It can lead to fatigue and discomfort.

Sitting on the edge of the chair often causes bassoonists to inadvertently lean forward pushing their internal organs up, preventing the lungs from expanding freely and restricting air support. If the abdominal muscles are kept tense during play the diaphragm may not be able to contract properly.¹¹ A chair with a backward tilt may also restrict breathing by compressing the lungs.

Depending on the height of the player and the type of chair being used additional adjustments may be needed to perfectly balance the instrument. If the instrument has a strong pull forward, the seat strap and boot joint can be moved to the front on the chair, allowing the contact point between the thigh and the bassoon to be closer to the player's knee. Also, if the player's feet cannot reach the floor so that both feet can be placed flat on the ground comfortably it may be difficult to stop the bassoon from pulling forward. This is due to the forward slope shape of the right thigh that is accentuated when the legs and feet are hanging from the chair. A smaller chair, footrest or small platform can be used to avoid this problem.

¹¹ William J. Dawson, "Ask the Doctor: Playing at Your Best," *International Double Reed Society* vol. 24 no. 4 (2001): 95.

When the bassoon is balanced so that it is set closer to a vertical position, it becomes difficult to have a good embouchure. Traditional German bend bocals are not shaped to allow bassoonists to hold the instrument in this manner. The bocal and reed point down when the bassoon is held vertically with a traditional German bend bocal. This produces an embouchure in which the reed points down towards the tongue forcing the player to accentuate the mouth's natural overbite also leading to awkward jaw positions and potential injury.

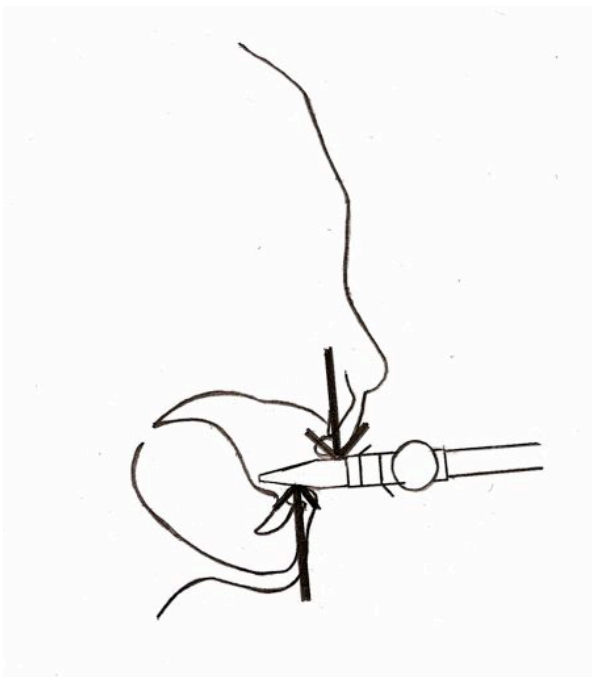


Image 22: When the bocal and reed approach the mouth's cavity with a downward direction, the natural overbite embouchure can be exaggerated placing the lower lip very close to the tip of the reed. When the bassoon is held close to a vertical position the bend of the bocal may give the reed a downward direction in the mouth. Trying to compensate this by pushing the jaw out can create tension.

Influenced by Dennis Michaels' setup, Bill Buchman uses a bungee cord that he attaches from the back of the chair to the bassoon's strap-ring. Mr. Buchman's bocal has also been slightly modified so that when his reed is fixed on the bocal it

has the right direction to allow a symmetrical embouchure. Like Ms. Burkhardt's strap, the bungee cord keeps the bassoon from pulling forward. However, it also allows Mr. Buchman a certain amount of movement while holding the bassoon in playing position.

With the support of the bungee cord, Mr. Buchman can keep his bassoon leaning forward a lot more than if he tried to balance it on his thigh to keeping it from pulling forward. With the bassoon leaning forward Mr. Buchman is able to have reed with the desired direction inside the mouth's cavity. When looking at his setting from the side, his bassoon rests closer to his hip resembling the way German bassoonists hold their instruments.



Image 23: William Buchman keeps the weight of the instrument off his left hand and arm through the use of a bungee cord. The cord allows the instrument to lean forward without being too heavy and is flexible enough to allow expressive movement.



Image 24: Suspending the bassoon with a seat strap and a bungee cord.



Image 25: This image shows the angle of the reed and bocal in relation to the face and the instrument leaning forward. This setup allows Mr. Buchman to play with a symmetrical embouchure.

Barrick Stees' approach to holding the instrument is based on finding a focal point while sitting in playing position. Finding this focal point allows the muscles of the lower back and the abdomen to work together to provide support. Mr. Stees explains that using the back support of the chair deactivates these muscles, as they no longer help to support the body and instrument's weight. To find this focal or pivot point one has to sit closer to the edge of the chair, so that more muscles become actively involved in the support process.

To make sure that the back is properly lined up Mr. Stees follows a simple procedure that he has learned from Alexander Technique sessions. Mr. Stees explains that for this procedure one can stand with the back leaning slightly against a wall. There should be two places where the body contacts the wall, the shoulders and buttocks. The neck should be kept naturally straight without pushing it back or keeping it tense. When the back is in this position the body is properly lined up. Bending the hips and knees while leaning against the wall without changing the position of the back helps test the back alignment. When the hips and knees bend the back should remain relaxed, if it becomes tense it might not be aligned properly. Once the back is aligned properly one can proceed to the chair and sit down flexing only the hips and knees. When sitting with the back properly aligned one should avoid reaching for the instrument, or leaning forward too much.

Once sitting on the chair with the back aligned, the focal or pivot point is found by leaning slightly forward without changing the back alignment. In this position the weight is supported with the crutch and inner thighs on the chair. After

supporting the weight with the crutch and inner thighs, the upper body is moved back slightly towards the chair's back support without changing the back alignment. As the upper body is moved slowly towards the back of the chair, rocking on the pelvis, the buttocks start to support the weight giving first a softer cushion until a position is reached where the sit bones become prominent. At this point one has found the focal point in which the lower back and abdominal muscles are working together to support the body. Finding the focal point allows these muscles to not only provide support for the body and posture, but also become involved in sound creation by supporting the airstream.



Image 26: Barrick Stees sitting position activates the back and abdominal muscles by finding a focal point.



Image 27: Angle of the instrument, reed and bocal from the right side.



Image 28: The back is involved in the sound support and does not rest on the chair's back support.

Mr. Stees allows the bassoon to pull forward when playing, supporting the weight of the instrument with the left arm, hand and upper back. Sitting towards the front of the chair keeps the back muscles providing support to prevent his upper body and the instrument from excessively leaning forward. This focal point also allows him to keep his instrument in the right angle so that his reed has the desired direction as it comes into the mouth's cavity.

Although Mr. Stees setup is quite different from Mr. McGill's balanced position, Mr. Stees believes that there are situations in which knowing how to perfectly balance the instrument so that it places no static load on the hands and arms can provide an ideal setup. Mr. Stees approach to his embouchure is also very

flexible allowing him to change the angle of the reed inside the mouth's cavity to favor different dynamics and registers.

William Winstead actually likes to have some of the weight of the instrument falling forward in his left hand when he plays. This pressure has never caused him problems, but the amount is slight. He also uses the chair's back support allowing him to relax his back and sit comfortably.

Since a bit of the bassoon's weight rests in the left hand, Mr. Winstead's bassoon does not remain in position when he removes both hands. Even when only the right hand is removed the instrument will rotate counterclockwise on the thigh unless the reed is in the mouth. The solution Mr. Winstead has found to control this rotation is a seat strap with a leather cup made by Shane Wieler of Marcus-Wieler Bassoons. The cup is made to the measurements of each individual bassoon, and the cup holds the boot joint tightly and keeps it from rotating, although occasional readjustment may be necessary.



Image 29: The bassoon leans forward putting some weight on the left hand and arm. It also allows the reed to have a slightly upward direction in the mouth's cavity.



Image 30: Angle of the bassoon from the front. Both feet are placed flat on the ground.



Image 31: The reed and bocal have a slightly upward direction in relation to the face.

Finding a seat strap that permanently keeps the instrument from rotating may provide a more convenient solution. Mr. Winstead indicates that changing the place where the seat strap is attached to the cup may in fact help provide the support needed to permanently keep the instrument from rotating.

Another solution to prevent the instrument from rotating on the player's thigh is to add a guard on the on the boot joint, next to the guard that protects the thumb Bb and F# mechanisms. Both guards would then rest on the thigh preventing the bassoon from rotating back or forward.



Image 32: Both guards contact the thigh and keep the instrument from rotating in either direction. The guard on the right side covers the Bb key and Ab-Bb trill key mechanisms. Marcus and Wieler installed the guard on the left. The black attachments on the left guard also help keep the instrument at the right rotation on the thigh.

Carol Aufmann, a teacher and orchestral player in the Cincinnati area, balances her bassoon holding it parallel to her upper body (when looking at her setup from the side) Balancing the instrument parallel to the upper body helps keep the instrument from pulling forward excessively and keeps it balanced close to a vertical position. Having her upper body parallel to the instrument allows her to have the reed approach the mouth's cavity at the desired angle. Ms. Aufmann prefers when the vocal and reed approach the mouth's cavity at a perpendicular angle. She does not always use the chair's back support but sometimes sits near the front edge of the chair, however, she always aims to keep the instrument parallel to her upper body without modifying her embouchure.



Image 33: When the thigh contacts the instrument closer to the long joint, the bassoon is often allowed to lean more to the left side to keep it from pulling to the player's right side.



Image 34: Ms. Aufmann holds the instrument parallel to her upper body to keep it from leaning forward and putting excessive weight on the left hand and arm.



Image 35: The reed and bocal are perpendicular to the player's face.

Ms. Aufmann finds difficult to play on chairs that have a forward slope (like cello chairs) She finds helpful to place a small platform under her feet, when practicing or playing a concert, to provide support and balance. Her bassoon has a tendency to rotate counterclockwise on her thigh but she is able to keep it in place by supporting it with her right hand.

Tall players like Carl Nitchie and Juan de Gomar, who are both over six feet tall, also find it uncomfortable to place both feet flat on the floor. When a player has long legs, placing the feet flat on the floor raises their thighs from the chair placing all their weight on the buttocks. When the thighs are raised from the chair the seat strap can easily slide off the chair making it difficult to keep the instrument at the

desired position. Mr. Nitchie always puts one foot in front and the other back under the chair when he sits to play his instrument.



Image 36: for tall players placing one leg in front and the other back under the chair is the most comfortable position. Placing both feet flat on the ground raises the thighs allowing the seat strap to easily slide off the chair.



Image 37: Juan de Gomar playing in the sitting position.

The wrists and hands

Preventing excessive effort to press down keys is often a concern for many bassoonists. In fact Shane Wieler, from the Marcus and Wieler bassoon workshop, has had more requests to soften keys' action than any other type of adjustment. To soften the keys' action on an instrument the springs that keep the mechanisms neutral must be weakened, offering less resistance as they flex. However, if the springs are too soft, the instrument can develop leaks, become unresponsive and out of tune.

When keys are too hard they usually affect both thumbs and pinkies hindering technique and even causing injury. Pressing certain keys on the very edge, as far away from the fulcrum as possible, has helped David McGill be more relaxed and efficient. His third finger and pinkie on his right hand press the G and F keys on the very edge allowing him to press these keys down with minimal effort. Having more leverage can ease physical effort. However placing the fingers on the edge of the keys, gaining a few millimeters for leverage, might not make a noticeable difference in all cases.

The constant tension of opposing muscle groups in the hands and forearms is also a common cause of excessive effort when depressing the instrument's keys. Continuous excessive effort of opposing muscle groups can lead to a condition known as co-contraction.¹² Re-training the body with the help of a physician can be

¹² William J. Dawson, "Ask the Doctor: Playing Without Straining," *International Double Reed Society* vol. 30 no. 3 (2007): 76.

helpful to avoid excessive muscular tension when playing and to avoid co-contraction.



Image 38: The third and pinkie fingers contact the keys on the very edge, as far from the fulcrum as possible, requiring the minimum effort possible to depress them.

Pressing keys on the very edge might also require technical adjustments when playing certain note combinations. For example, pressing the right pinkie F key on the very edge might make it more difficult to slide to the pinkie F# key or to the Ab key. When pressing the keys on the edge these kinds of note combinations, where the finger needs to slide to another key may need more preparation.

Moving all the fingers from the knuckles when playing an instrument allows performers to have almost effortless playing, providing the best leverage and the least amount of finger movement. On the bassoon however, the weight of the instrument often hinders both index fingers restricting the way they can be moved. The index finger on the right hand often helps support the instrument by pushing on the C sharp trill key guard or post on the boot joint. This is known to be a frequent cause of injury as the index finger's middle joint pushes against the C sharp guard pressing nerves and impeding good circulation. The pressure on the middle joint of the index finger against the C sharp trill key guard often comes from the weight of the hand and arm resting on it, but it may also come from constantly keeping the instrument from rotating counterclockwise on the player's thigh.

Using a hand rest or crutch is often the solution to avoid putting pressure on the right hand's index finger. A hand rest allows the player to rest the weight of the hand and arm on the palm while also keeping the instrument from rotating on the thigh. Using a hand rest also allows the right hand index finger to move from the knuckle facilitating trills and overall playing. However, players with small and even medium size hands may find that adding any kind of hand rest makes their hands have to reach for the keys hindering their technique.¹³

Another option for players whose technique is hindered when using a hand rest is to put a guard (made for contrabassoon) above the C sharp trill key. This

¹³ Although this study has not found a strong correlation between hand size and the use of hand rests, it is important to observe the right hand on a mirror when adding a hand rest to determine if using it causes the right hand to stretch. Participant's hand sizes were recorded and are available on p. 70.

guard can be installed where the post that holds the hand rest is usually screwed on. This guard can provide the same support a hand rest does without moving the hand and fingers away from the keys.

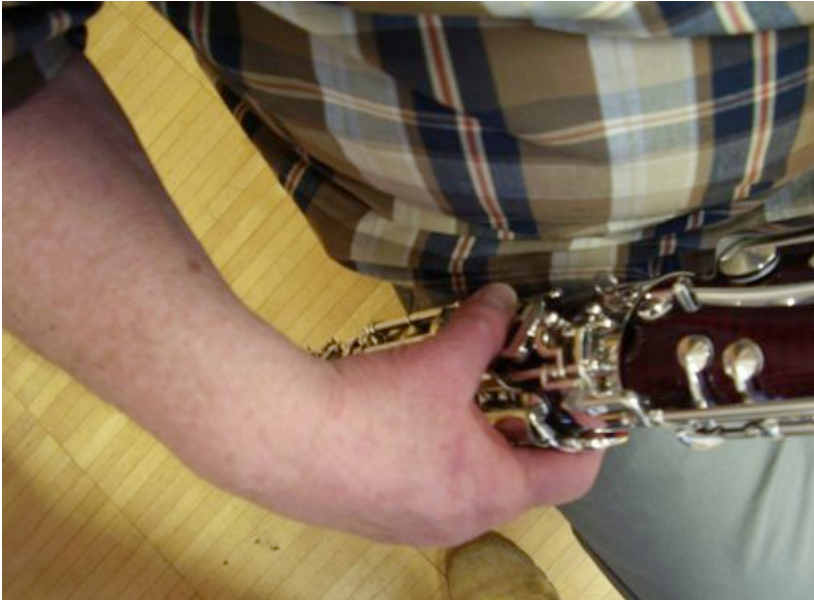


Image 39: Instead of using a hand rest to contact the instrument, a guard allows the player to contact the instrument without pressing the right hand's index finger on the C sharp trill key guard.

This type of guard allows the weight of the hand and arm to rest on the palm while also allowing the index finger to move from the knuckle. To install this guard it is necessary to remove the post where the hand rest is attached if one is installed on the instrument.

There are no accessible solutions to allow the index finger on the left hand to move freely from the knuckle. The contact point between the bassoon and the left hand is often an area that includes the opposite side of the finger's knuckle and part

of the index finger. Supporting the instrument's weight with the index finger on the left hand, like supporting the weight of the arm and keeping the bassoon from rotating with the right index finger, can cause the finger to feel numb and tingling due to the instrument pressing against a nerve cluster causing nerve compression.

To keep from getting injured and to allow a greater amount of movement and flexibility on the left hand, the instrument can be balanced so that the amount of weight placed on the left hand can be kept to a minimum or completely eliminated. When the weight of the instrument on the left hand is completely eliminated, the contact point between the instrument and the left hand remains to keep the hand and fingers in place, however there is much more flexibility of movement for the left hand as Ms. Burkhardt setup shows (further details on her approach follow below).

To ensure that the weight of the instrument is not restricting the left hand, the performer can try to play allowing only the tips of the fingers and the contact point in the right hand to support the bassoon. If this feels impossible or drastically hinders technical proficiency it is probable that there is too much weight being supported with the left hand.

Because both index fingers are often supporting static weight, the hands often lean towards them allowing both index and both middle fingers to be curved while keeping the ring and pinkie fingers in an almost straight position. David McGill points out that because the tone holes for the first, second and third fingers are lined up on the wing joint (only first and second on the boot joint) and our middle finger

is longer than the index and ring fingers, the index, middle and ring fingers must be curved to get three fingers arranged in a straight line.

William Winstead points out that keeping the fingers curved, including the ring and pinkie fingers on both hands, is also the best way to avoid collapsing joints. Since the ring and pinkie fingers are also the weakest fingers, and perhaps because they are often kept in a straight position, they are prone to suffer from tingling.¹⁴

The ring and pinkie fingers are also prone to have collapsing joints. However, Mr. Winstead has found that certain collapsing or locking joints are not always fixed by curving the fingers, especially if the collapse occurs at the knuckle or base of the thumb between the metacarpal and the first phalanx. The thumbs have more keys to depress and move to more different positions than the other fingers. It can be very difficult to keep them from collapsing when they move quickly from key to key.

Although there might be no perfect solution for this kind collapsing or locking finger joint, keeping the thumbs and other fingers as curved and relaxed as possible can be part of the solution. Training the fingers to move properly with specialized professional guidance can correct most problems of hypermobility (double-jointed) of the joints in the hands. Through retraining, strengthening exercises and in some cases the use of finger splints hypermobility is gradually controlled.¹⁵

¹⁴ Paula Brusky, "Performance Related Musculoskeletal Disorders in Bassoon Players" (Ph. D. diss., University of Sydney, 2009), 76.

¹⁵ William J. Dawson, "Ask the Doctor: Hypermobility," *International Double Reed Society* vol. 23 no. 1 (2000): 53-54.

Elizabeth Burkhardt balances her bassoon using several straps, and does not need to have a constant contact point on the left hand allowing her hand to slide up or down the long joint as she plays the instrument. She has placed some tape like material on her long joint that allows her hand to slide easily. Keeping her fingers curved caused tension in her hands so she adopted a very flexible approach to holding her instrument and forming her hands. She varies the position of her hands and fingers from moment to moment allowing the fingers to have different travel distances according to how her hands feel on a particular day. She lets her wrists and forearms initiate some movements (like a pianist trills from the wrist and forearm) giving her greater moving flexibility. Having her instrument held in one position with several straps has allowed Ms. Burkhardt to have the most flexible hand and finger movements among the bassoonists interviewed.

Apart from holding the instrument in playing position with several straps, Ms. Burkhardt has modified several keys on the long and wing joint. The low C sharp and low E flat keys on the long joint have been moved up so the left pinky finger does not have to stretch to reach them. On the wing joint the E flat trill key between the C and D tone holes has been moved to make room for a key that covers the C tone hole and keeps the third finger from having to stretch to reach the tone hole.

These modifications have allowed Ms. Burkhardt to place the left hand's third and fourth fingers closer to the second finger. The result is a very relaxed left hand that does not need to stretch to reach the keys. Considering that the third and fourth

fingers on both hands are often prone to injury, these modifications are not only making her technique easier, but also helping her avoid potential injuries.

On the long joint the low D key has also been modified to allow the left thumb to slide easily. This allows the thumb to effortlessly slide to reach the whisper and C sharp keys on the wing joint while pressing the low D key and to quickly slide to the low C key on the long joint. Ms. Burkhardt used the same tape like material she used on the long joint contact point for the low D key.



Image 40: The tape-like material on the long joint and wing joint allow Ms. Burkhardt to slide her hand and index finger easily to allow greater flexibility when playing.

Ms. Burkhardt does not use a hand rest because her hands are too small and using a hand rest makes her have to reach for the keys.

Keeping the fingers close to the instrument allowing them to consistently have the same travel distance is an approach that can facilitate technical proficiency. William Winstead and Martin James keep their left hand pinkie constantly touching the low E flat key and their right hand ring and pinkie fingers constantly touching the G and F keys when they play. The contact points on both hands and resting these fingers on the keys help them keep both hands in position, while also keeping their fingers at a constant distance from the instrument. Mr. James does not use a hand rest but has also installed a guard on the boot joint that contacts his hand on the index's first phalanx just above the knuckle.

Shawn Mouser, from the LA Phil, keeps his fingers close to the instrument by feeling the air stream on his finger tips as it comes out through the tone-holes. He does not keep his pinkies touching the keys but through feeling the air stream he is able to keep his fingers at a consistent travel distance from the instrument.



Image 41: Shawn Moser keeps his finger at a constant distance from the instrument by feeling the airstream on his fingertips.

More bassoonists suffer from arm and wrist injuries than any other type of injury followed by hand and finger injuries.¹⁶ However, among the bassoonists interviewed there were no pressing concerns about the position of the wrists and no wrist injuries from playing the bassoon (arthritis on the wrists was reported a couple of times, however it was attributed to aging rather than playing) For David McGill the positions of the wrists are the result of the holding position, rather than an influencing factor. In other words, to determine the holding position the proper embouchure is the main concern, followed by properly balancing the instrument so that it puts not weight on either hand, and as the instrument is balanced on the thigh the hands approach the instrument allowing the wrists to bend as needed and the arms to relax.

William Winstead has a similar approach, however he does not balance the instrument completely, but allows the instrument to slightly pull forward. Barrick Stees and Carl Nitchie allow the right wrist to bend while keeping the left wrist straight.

¹⁶ Ibid., 83.



Image 42: David McGill holding the instrument allowing the wrists to bend to accommodate the position of the instrument.



Image 43: Barrick Stees allows the right wrist to bend slightly while playing. He does not use a hand rest, but rests his index finger on the C sharp trill key guard.

Carol Aufmann and Bill Buchman try to keep both wrists as natural and neutral as possible. Mr. Buchman imagines hugging around a barrel as he grasps his bassoon keeping his wrists from bending too much.



Image 44: Carol Aufmann keeps her wrists as neutral as possible. She does not use a hand rest.



Image 45: William Buchman grasps the instrument as if hugging a barrel keeping his wrists from bending excessively.

There are several factors that influence the position of the wrists. When the instrument contacts the thigh close to the knee the right wrist can become excessively bent especially if the instrument has the tendency of rotating counterclockwise on the thigh. When the instrument rests close to the knee, the arms reach forward and as the elbows are lowered the right wrist may bend

excessively. Using a hand rest can make this worse as it pushes the hand off the instrument making it reach for the keys.

When the instrument is rotated clockwise and pulled closer to the body the wrists often become straighter and the elbows more flexed. However, when the instrument is too close to the body the right elbow is pushed back and this can be uncomfortable as the right arm may press against the chair's back support.

The left wrist is usually easier to keep in a straight or neutral position because of the position of the left arm. The left wrist is usually not affected as much as the right wrist by the rotation of the instrument.



Image 46: When the instrument has the tendency of rotating counterclockwise the right wrist may become excessively bent. This tendency is often the result of the shape of the thigh and the placement of the guards on the boot joint. When a player cannot place both feet flat on the ground this tendency often becomes accentuated.

When supporting the bassoon on the thigh, it often rotates slightly counterclockwise. The forward sloping shape of the thigh resting on the chair, combined with the guard covering the B flat mechanism on the boot joint that rests on the thigh when in playing position are often the reason for this tendency. When the instrument is allowed to rotate the bocal needs to be positioned a little further to the player's left side to have reed meet the mouth. However, the right wrist may become excessively bent if the instrument is allowed to rotate and rest unaltered on the thigh.

To determine if any of the participants were keeping their instruments from rotating on their thigh with their right hand, they were asked to hold the instrument in playing position and play a few notes ending with an open F fingering. While still fingering open F they took the reed out of the mouth letting it rest just below their nose and took their right hand off the instrument. With the exceptions of Michelle Grego, Elizabeth Burkhardt and David McGill, when right hand was taken off the instrument it immediately rotated counterclockwise. However, for most of the participants, the static load added on the right hand when keeping the instrument from rotating on the thigh was not reported to be a concern.

Playing standing up

Playing bassoon in the standing position often presents more difficulties than playing in the sitting position. The position of the bocal and reed, the weight of the instrument on the left hand, the method of suspension used and the overall position of the instrument are often very different from the sitting position. Additionally the exhaustion from lifting the instrument for the length of a rehearsal or concert can be physically overwhelming. David McGill feels that playing the bassoon in the standing position is like playing a whole different instrument. Two different bocals are needed with different bends to allow the proper embouchure for both the sitting and standing positions. This and other complications have convinced Mr. McGill that the bassoon is like the cello, an instrument that should be played only sitting down.

For many bassoonists, finding a solution to the challenges of playing the instrument in the standing position is a task whose difficulties outweigh any perceived benefits. With the exception of Barrick Stees all professional bassoonists reported that they had not rehearsed or played in the standing position for at least a year, and some of them for even longer than a decade. However, for most bassoonists the reason for avoiding the standing position is not so much a lack of interest as it is a lack of a good solution to the challenges it presents.

For playing standing up Barrick Stees uses a balance hanger, shoulder harness and a distance guard (made by Holden McAlleer) that he had installed on his instrument with an ergo post. Even with a balance hanger installed, the weight of the instrument can cause some pain on his left hand. However, through practice and

conditioning he is able to play long enough without pain interfering with his performance. He positions his right foot slightly behind his left foot to make the boot joint rest farther back when the distance guard contacts his body. The distance guard pushes the instrument away from his hip keeping the mechanisms away from the body and from clothes. The shoulder harness has several strings that hold the hook that attaches to the bassoon's strap ring. The strings allow the bassoon to be kept at the right angle away from the body.

For William Winstead, conditioning has also been an important step in preparing for performing standing up. He performs standing up when playing as soloist with the CSO every few years. Conditioning his body to play standing is a gradual process that allows his body to build up the necessary strength to compensate for the extra weight on his left hand, arm and back. Gradually incorporating practicing the instrument in the standing position on his practice sessions helps him condition his body to lift the weight of the instrument. Mr. Winstead uses a shoulder harness, but does not use a balance hanger causing the instrument to put significantly more weight on the left hand when playing standing up. Adjusting every few years to play standing up has been an easier solution for Mr. Winstead than trying to modify his instrument in any way.

Conditioning is not limited to playing in the standing position. Martin James points out that when he is not playing on a daily basis, supporting the bassoon with his left hand produces tension and pain in his left forearm. Daily practice however, helps him manage the pain and eventually overcome it. The left forearm is more

prone to injury than the right forearm.¹⁷ Static load on the left hand and arm is often considered a normal requirement of playing the instrument.

With the availability of straps and other devices that help keep the left hand free of weight when playing the bassoon the left hand may be freed from its usual weight-supporting role. When a bassoonist is able to balance the instrument keeping all the weight off the left hand without the use of straps or other devices it can appear to be a magical act, especially to other bassoonists.¹⁸ David McGill has astonished bassoonists with his floating bassoon on more than one occasion.

Mr. James has noticed that playing in the standing position limits his technique because of the added tension on the left hand and other postural differences from the sitting position, but he believes that like most limitations, it can be overcome through proper conditioning.

¹⁷ Brusky, 93.

¹⁸ Robert Danzinger, "Holding Up My End of the Bassoon," *International Double Reed Society* vol. 29 no. 2 (2006): 106.



Image 47: William Winstead playing standing up using a shoulder harness and without a balance hanger. He places both feet lined up and distributes the weight on the soles of the feet.



Image 48: Barrick Stees uses a shoulder harness and a distance guard that is installed on an ergo post allowing him to get it at the right angle. The distance guard keeps the bassoon away from the body. The strings on the shoulder harness allow him to keep the instrument at the proper distance from the body.



Image 49: Martin James playing standing up using a neck strap. He does not use a balance hanger.

Because the instrument is closer to the body when playing in the standing position the wrists are naturally straighter than when in the sitting position. However, when the instrument rests against the right hip (if the instrument does not have a distance guard) the mechanisms for the right thumb keys can sometimes be restricted as the weight of the instrument presses them against the body.¹⁹ This can be especially problematic for the thumb F sharp and the A flat B flat trill key mechanisms. Clothing often gets in the way of the pads and keys when the instrument is pressed against the body. Turning the bassoon counterclockwise can help keep the keys and mechanisms off the hip but also makes the right wrist bend as the instrument rotates.

¹⁹ Alan Leech, "Help for the Standing Bassoonist," *International Double Reed Society* vol. 8 no. 3 (1985): 11.

Installing a distance guard can allow the instrument to be rotated at a comfortable position so that the right wrist is neutral. Another option is to extend the guard that covers the B flat and F sharp mechanisms so that the guard rests against the hip allowing the mechanisms to move freely. Extending the guard also allows the instrument to be kept closer to the body, as it does not keep the instrument away from the player like a distance guard does.



Image 50: This extended guard made by Marcus and Wieler covers the mechanisms of the A flat B flat trill key and F sharp thumb keys. Like the distance guard it keeps the cloths from the tone holes and mechanisms and allows the instrument to rest closer to the body. When playing in the standing position the whole surface of the guard contacts the hip and thigh keeping it stable.

A common tendency is to lean forward on the toes when playing in the standing position. This tendency is the result of the weight on the left hand and the often-awkward way the bassoon presses against the hip. Barrick Stees points out that this type of posture is more commonly found among players that use a neck strap to suspend the bassoon while in the standing position.²⁰ Leaning forward increases the weight on the left hand resulting in excessive pressure on the hand, arm and back eventually causing pain and exhaustion.

To find a better posture for the standing position the knees should be slightly bent while also distributing the weight evenly on the whole surface of both soles centering the weight without leaning back or forward. In his blogs Barrick Stees compares an ideal posture for playing in the standing position with a Tai Chi horse stand.

²⁰ Barrick Stees, *Playing Standing Up* (Barry Blogs, Tuesday May 10 2011) [database online]; available from www.steesbassoon.blogspot.com/.



Image 51: This Image of a Tai Chi horse stand was copied from Barrick Stees' blogs. It illustrates an ideal posture for playing bassoon in the standing position.

A well-balanced posture that keeps the back straight and the knees slightly flexed is ideal for playing bassoon in the standing position. Distributing the weight evenly on the soles of the feet keeps the player from leaning back or forward. It also keeps the instrument from tipping forward too much as the bassoon has to be brought back towards the player to keep the weight well distributed on both feet. A straight back facilitates good air support allowing the lungs to freely expand and the slightly flexed knees facilitate balance. A good posture should activate the least amount of muscles throughout the body and should produce the least amount of muscle tension. This is recommended for both the sitting and standing positions.²¹

When the appropriate method of suspension is used, this posture can help prevent excessive fatigue and pain when playing in the standing position. Using a neck strap, as Mr. Stees points out, can make keeping this posture difficult, since the weight of the instrument is placed on the back of the neck pulling the upper body

²¹ Dawson, 96.

forward. Some types of neck straps should also be avoided because they limit blood circulation strangling the neck and causing neck and shoulder pain. A shoulder harness or halter style strap would be better suited to suspend the instrument as it distributes the weight on the shoulders and back keeping the neck muscles from overuse.²² A neck strap with larger padded surface contacting the neck and back, such as a yoke, is better suited to facilitate a good posture than a regular neck strap.



Image 52: A shoulder harness for suspending a bassoon. It keeps the weight off the neck allowing for better breathing.



Image 53: Yoke style strap.

²² William J. Dawson, "Ask the Doctor: When Making Music Becomes Painful," *International Double Reed Society* vol. 32 no. 2 (2009): 115.

Some additional notes

When asked what direction the reed had in the mouth's cavity Carl Nitche, Juan de Gomar and Elizabeth Burkhardt believed that the reed had a slight downward direction (as if pointing to the tongue). Carol Aufmann and Martin James felt the reed came into the mouth's cavity in a perpendicular angle (or straight neither pointing up or down). Barrick Stees feels the reed enters the mouth cavity perpendicularly, however, he varies the direction of the reed depending on the register and dynamics. William Winstead believed the reed came into the mouth with a slight upward angle. David McGill William Buchman felt their reeds came into the mouth's cavity with an upward direction (pointing to the palate).

The direction of the bocal and reed as it enters the mouth's cavity was the most important part of holding the instrument correctly for William Winstead, William Buchman and David McGill. Mr. Buchman and Mr. McGill prefer a symmetrical embouchure. Mr. Winstead prefers an embouchure with a slight overbite. Elizabeth Burkhardt and other participants do not consciously adhere to a particular embouchure, but their approach is based more on the particular feel of a reed and sound.

William Winstead, Martin James, David McGill, Barrick Stees and William Buchman believed that having the reed come into the mouth's cavity with a downward direction (pointing to the tongue) caused the reed to be unresponsive and sharp through different registers.

There was no strong correlation between hand size and approach among the participants. For example, participants with smaller hands did not always choose to play without a hand rest, even though some of them reported that it caused them to stretch in order to reach the keys. Michele Grego has smaller sized hands when compared to other participants and regularly uses a hand rest. Martin James used a hand rest before and does not use it now because his current bassoon does not have one installed but using a hand rest did not cause him to stretch and he states that playing with a hand rest would pose no problems for him. Mr. James hands size is also smaller when compared to the other participants.

Carl Nitchie has the biggest hands among the participants and he uses a hand rest, which is not visible in some of the pictures as the palm of the hand rests over it. Juan de Gomar who also has big size hands was not using a hand rest and his instrument did not have one installed, although he was planning on installing one in the near future.

For William Winstead, Shawn Mouser and Carl Nitchie approaching the instrument seemed a very natural and straightforward process. On the other hand, David McGill, Barrick Stees and Elizabeth Burkhardt have a particular process that helps them achieve the most efficient setup possible.

Hand Measurement

Left hands were measured for this study by drawing the contour of the hand on a sheet of paper and taking two measurements from the same hand, the first from the bottom to the top of the middle finger, and the second from the bottom of the palm to the bottom of the middle finger. Height and instrument type was also recorded.²³ The hands on the following images are actual size when printed on eight and half by eleven paper size.

William Winstead, Elizabeth Burkhardt and Carol Aufmann reported that that using a hand rest resulted in having to stretch the hand too much to reach the keys. However, Michelle Grego, Bill Buchman and Martin James all have smaller hands than William Winstead and all use or have used a hand rest without noticing any excessive stretching.

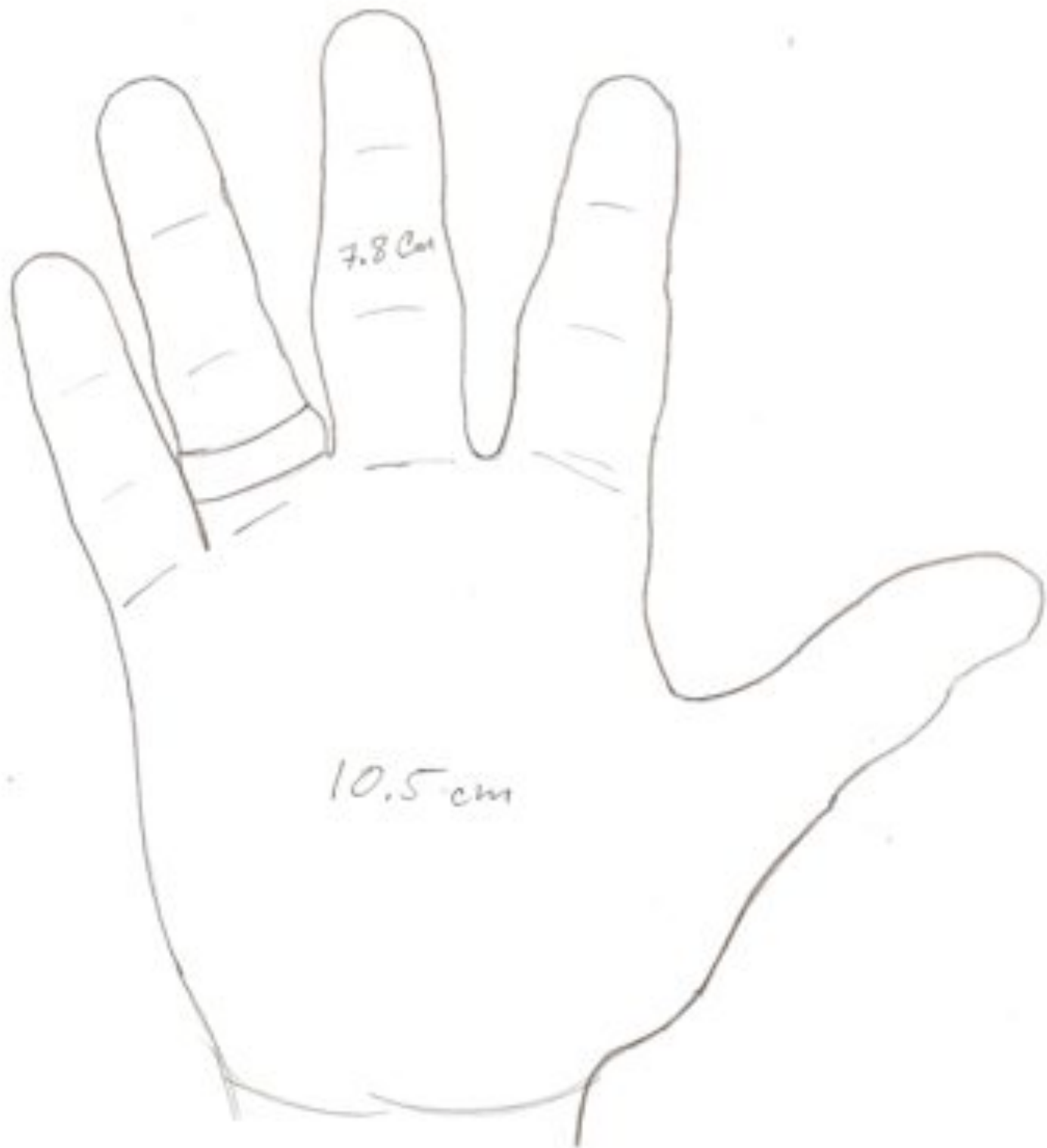
Initially the weight of the instruments was recorded by weighing each section of the instruments individually on a kitchen scale capable of weighing accurately fractions of an ounce. The difference in weight between a Heckel 13,000 series and a 9,000 series with approximately the same keywork was 0.6 lb. The Heckel 13,000 series weighed 7.5 lb. and the 9,000 weighed 6.9 lb. However, this was not done throughout the interviews to avoid the risk of accidentally damaging an instrument while weighing it.

²³ Missing from the forms are Mr. Winstead and Mr. James' instrument types. They play on Heckels 13,000 and 9,000 series respectively.

Winstead 57"



M. James 5'7"



Shawn Mouser

11.000

5'11"



5'6"

12,000

Michele Greco



Benny 5'10"

7,000



Bill Buckman 5'8"

Fox 660
43,000



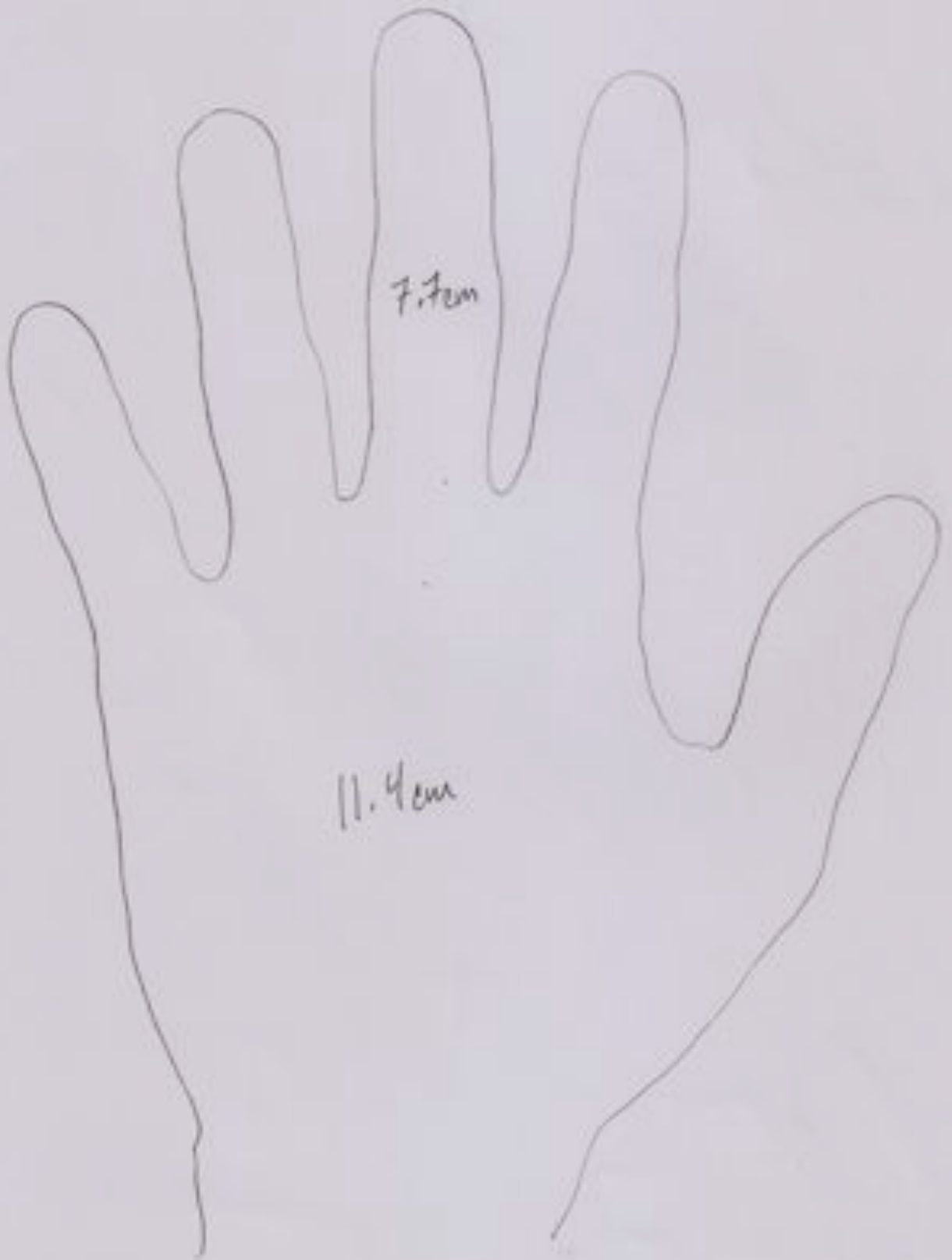
8.1cm

10.8cm

David McGill

5'10"

Heikel 12,000



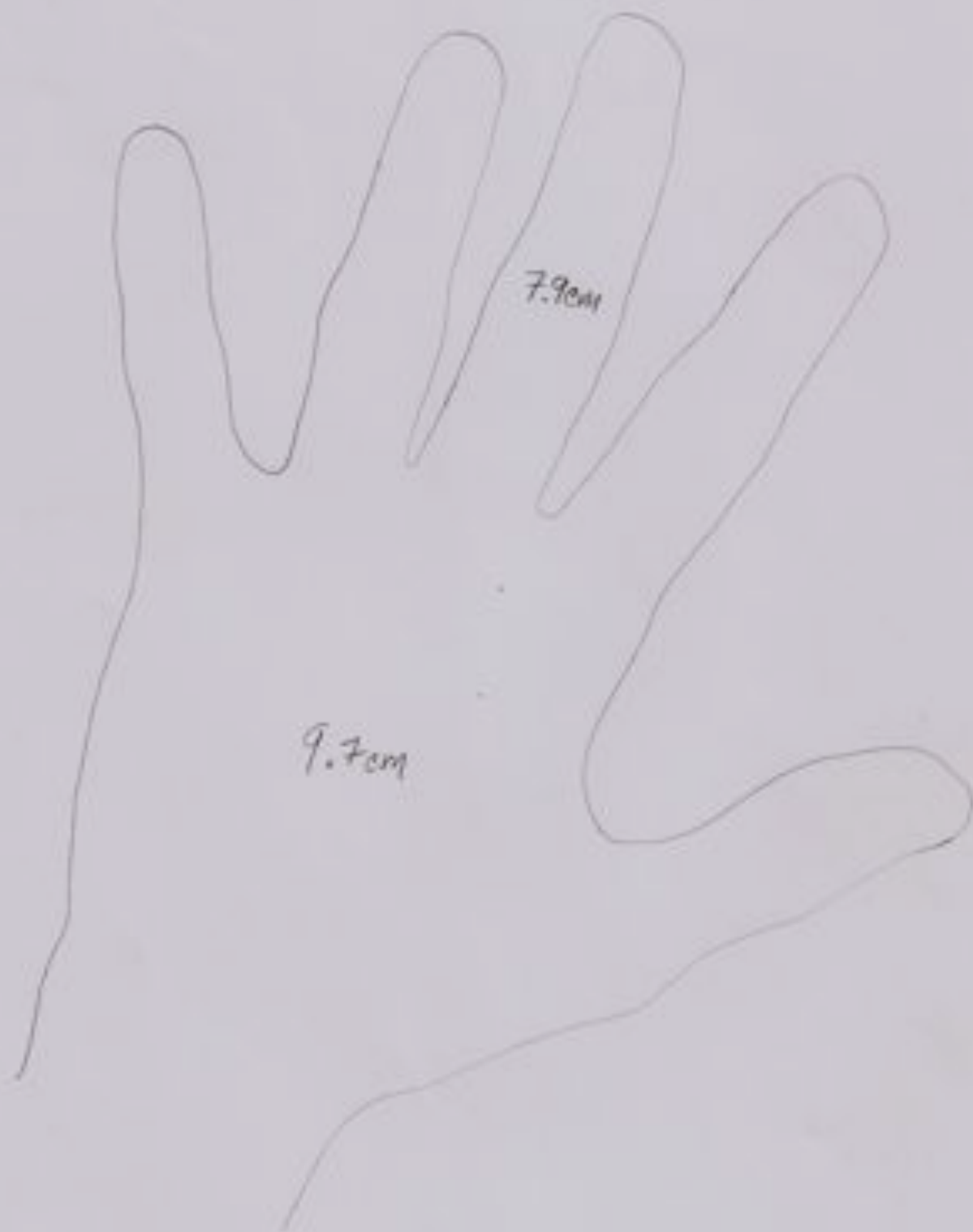
Carol Aufmann 5' 2.5"

Heckel 6,000



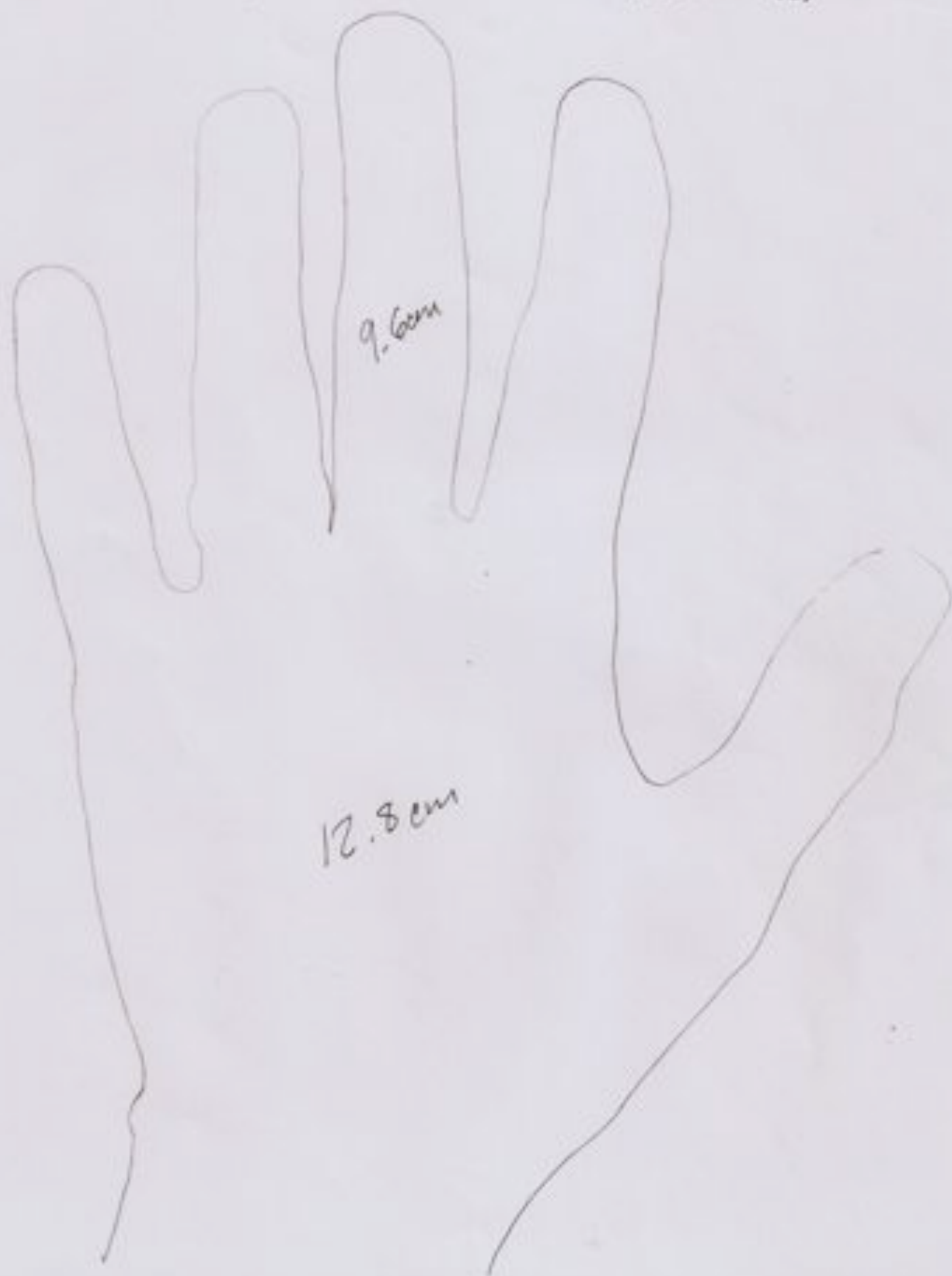
Liz Burkhardt 5'6"

Heckel 13,000



Carl Nitchie 6'4"

Heckel 12,000



9.6cm

12.8cm

Juan de tomar 6'3"

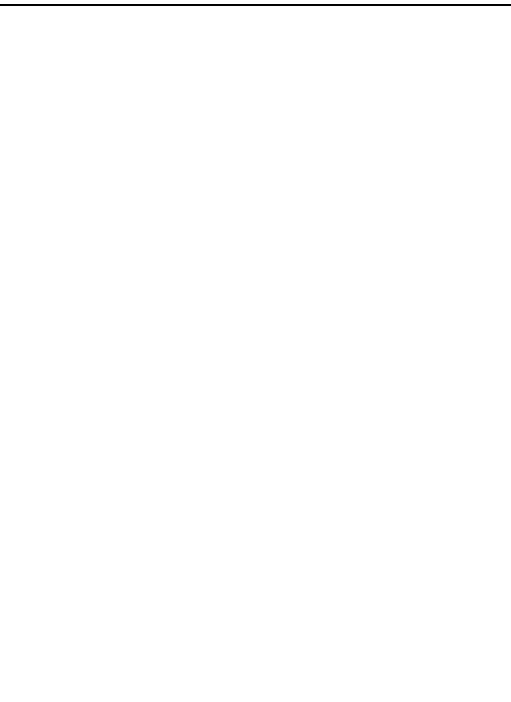
Heckel 7,000



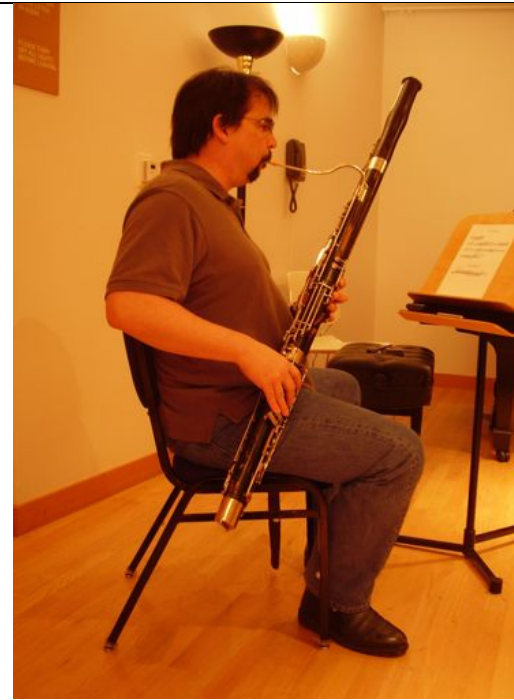
Sitting front

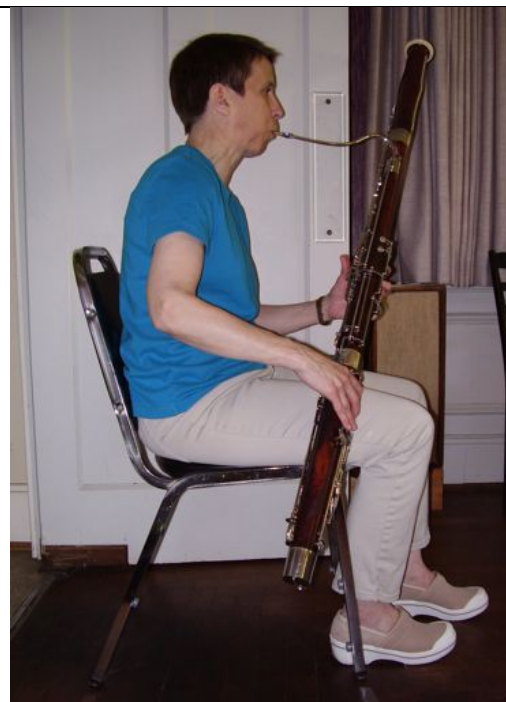
Participants in order: William Winstead, Martin James, Shawn Mouser, Michelle Grego, Barrick Stees, William Buchman, David McGill, Elizabeth Burkhardt, Carol Aufmann, Carl Nitchie and Juan de Gomar.



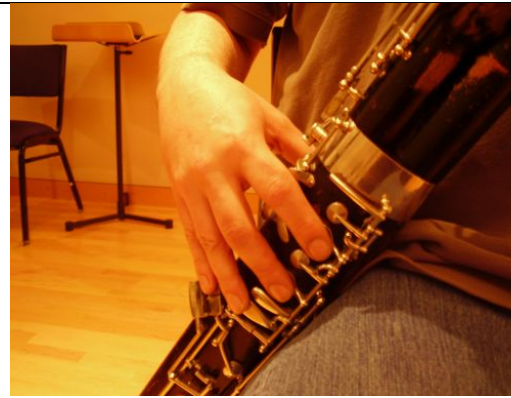


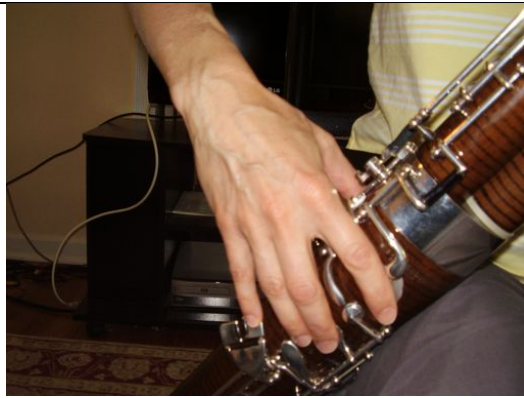
Sitting right side



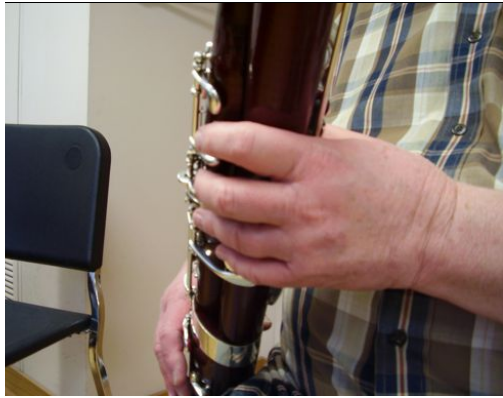


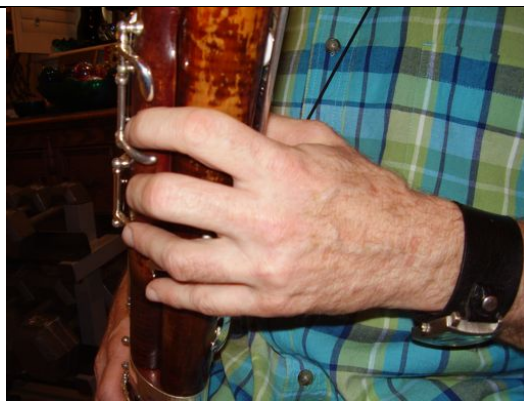
Right hand





Left hand



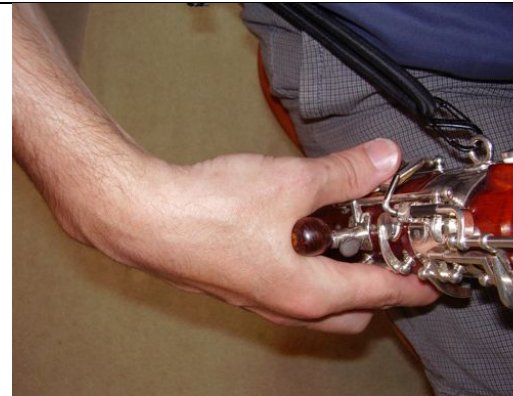


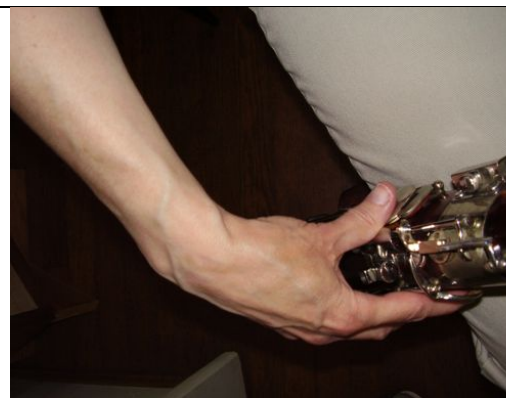
Contact point left hand





Right hand and wrist





Student Guide; Introduction

Learning to play the bassoon poses special difficulties for beginning students. Perhaps the most difficult is learning to properly hold and place the hands on the instrument. The instrument's dimensions and weight often cause young students to adopt wrong playing positions.²⁴ Sources intended for music educators and students briefly explain the principles of a good playing position;²⁵ some include basic information on hand positioning.

There is little evaluation of ergonomic principles available to the student bassoonist, making it difficult for the student to develop a good playing position. Since the aspects of a good position are interrelated, it is important for the player to have a comprehensive guide to avoid potential injuries and set the foundation for a proficient technique. A good playing position is achieved through careful and consistent practice, under the careful watch of an experienced bassoon teacher. Richard N. Norris explains in "Applied Ergonomics" that musicians who have awkward postures are prone to musculoskeletal injuries.²⁶

To lessen the difficulty of dealing with the instrument's great physical and ergonomic challenges, music educators often choose their future bassoonists among

²⁴ Christopher Schaub, "An Analysis and new Edition of Julius Wessenborn's Method for Bassoon," (D.M.A. diss., Florida State University, 2006), 43.

²⁵ William Dietz, "Bassoon," in *Teaching Woodwinds: A Method and Resource Handbook for Music Educators*, ed. William Dietz (New York: Schirmer Books, 1998), 21.

²⁶ Richard N. Norris and Jan Dommerholt, "Applied Ergonomics: Adaptive Equipment and Instrument Modification for Musicians," in *Performing Arts Medicine*, ed. Robert T. Sataloff (San Diego: Singular, 1998), 262.

the students who have had previous experience playing other instruments, like the piano, saxophone, or clarinet.²⁷ Previous playing experience helps the student develop finger dexterity and strength necessary to begin playing the instrument, which would be more difficult to develop starting on the bassoon. Experience also helps the student become acquainted with technical concepts of balance and playing positions. Beginning bassoon students today increasingly have either little previous playing experience, no bassoon teacher, or both.²⁸

The advantage created through previous playing experience is no guarantee for a good playing position on the bassoon. There are certain tendencies that have to be corrected by a bassoon teacher. According to noted pedagogue William Dietz, most saxophone players that switch to bassoon tend to support too much of the instrument's weight with the left hand producing tension.²⁹ Understanding the importance of practicing good posture can be the difference between a tension-free, consistent, and technically proficient playing and hitting a wall to no avail.

Music educators can become acquainted with some basic principles of woodwind musical instruments by reading educator's guides like Richard J. Colwell's *The Teaching of Instrumental Music* and William Dietz's *Teaching Woodwinds*. Instrumental guides divide into sections corresponding to each woodwind instrument. *The Teaching of Instrumental Music* also contains sections on string and percussion instruments. Each instrument's section focuses primarily on

²⁷ Frederick W. Westphal, *Guide To Teaching Woodwinds*, 5th ed. (Dubuque: Wm. C. Brown, 1990), 205.

²⁸ Schaub, 3.

²⁹ Dietz, 22.

the instrument's history, assembly and care, maintenance, and individual techniques such as breathing and reeds. Some contain pictures or diagrams to illustrate the few ergonomic concepts explained in the section. *Teaching Woodwinds* has perhaps more detailed information on the bassoon than other instrumental guides. The guide's editor, William Dietz, is a bassoon player and instructor at the University of Arizona.

Bassoon Basics

Contrary to widely held beliefs among musicians, medical studies have shown many performing techniques including muscular tension to be both unhelpful in the execution of any passage, and potentially harmful to hands and ligaments.³⁰ The second edition of the *Performing Arts Medicine* contains detailed information on the injuries caused by inefficient ergonomic habits on most musical instruments. It also offers solutions to some of these problems from a medical perspective.

A good embouchure is essential to have good intonation, response and dynamic range throughout the bassoon's register. The most popular type of embouchure is a natural overbite embouchure. This type of embouchure allows the player to choke the reed easily with the lower lip pressing the reed's lower blade closer to the tip where the reed offers less resistance.

³⁰ Ibid., 280.

Many reed makers strive to make their reeds with both blades as symmetrical as possible, even measuring the thickness throughout both blades with a dial indicator. Symmetrical blades vibrate in concert with each other, resulting in less vibrations cancelling each other and allowing the reed to be as resonant and responsive as possible. To allow a reed with symmetrical blades to resonate at its full potential a symmetrical embouchure is sometimes preferred. A symmetrical embouchure is one where the lips touch the upper and lower blades of the reed at the same place.³¹

An embouchure that emphasizes the mouth's natural overbite, such as when the reed comes into the mouth's cavity with a downward direction, can make the reed feel unresponsive. This is caused by the lower lip being placed too close to the reed's tip, where the reed is very sensitive to changes in pressure. For this reason most bassoonists prefer the reed to enter the mouth's cavity at a perpendicular angle or with an upward direction.

Managing the instrument's weight

The bassoon is a heavy instrument, some weighting over seven pounds. Learning to hold it properly is a difficult task that could take years. However, it is an important skill to learn early on because it is difficult to change the holding position once learned.³² Everything the student learns to do on the bassoon, whether

³¹ See section on overbite and symmetrical embouchure p. 20.

³² Westphal, 209.

technique, balancing the instrument, expressive movement, support, hand placement and angle of the reed's entry into the mouth's cavity is strongly dependent on the holding position. Therefore, changing the holding position can produce a chain reaction that affects all aspects of playing. Taking this into consideration, beginning players should make learning to hold the instrument properly one of their main concerns.

The player should be careful not to support too much of the instrument's weight with either hand. According to Richard N. Norris sustaining the weight of a tool with the hands is a common cause of injury, "The static loading that occurs when the weight of a tool is sustained and supported by the hand has long been recognized as a causative factor in workers' injuries."³³ The instrument's weight should be balanced, whether on a sitting or standing position, so that it does not produce excessive constant tension on either hand. It would be desirable once the player achieves such balance that he should remain in this posture most of the time while playing the instrument, allowing a limited amount of movement which always returns to the point of balance. The back should be naturally straight, not tense or constantly leaning forward.³⁴

Playing in sitting position is more common than in standing position, and is generally the way American bassoonists first learn to play the instrument. It is important that an adequate chair be used to facilitate the balance of the instrument and a good posture. According to Richard N. Norris, poorly designed chairs are a

³³ Norris, 266.

³⁴ Ibid., 270.

common cause of back problems.³⁵ Usually, flat chairs with no armrests are better than chairs with any degree of inclination.

There are several ways to suspend the instrument, the most popular being the seat strap and the neck strap.³⁶ The neck strap, however, is better suited for playing in a standing position, since it suspends the bassoon from the neck, forcing the player to lift the weight of the instrument. Suspending the bassoon with a seat strap on the other hand allows the player to balance the weight of the instrument so that it is supported on the seat strap. This is the method of suspension recommended for all beginning students.

The bassoon should not be held in a completely vertical position when using a seat strap, doing so will force the player to turn her face and body towards the instrument, causing several problems with the back, hand placement, and embouchure. The instrument should be held in a diagonal position across the body with the boot joint resting on the right thigh.³⁷

There are two main angles formed with the bassoon to be considered when playing with a seat strap; one can be seen when looking at a bassoonist from the side and the other from the front.³⁸ Both angles are crucial in balancing the instrument and both are dependent on the degree of inclination of the other and on the contact point of the bassoon and the player's thigh. This contact point of the

³⁵ *Ibid.*, 271

³⁶ Dietz, 21.

³⁷ Westphal, 209.

³⁸ *Ibid.*, 215.

thigh and bassoon will be different for each player depending on height. If the player is small the contact point will be high on the boot joint or closer to the long joint, since for a small player there will not be a need to bring the bassoon and bocal up to have the reed leveled with the mouth.

A high contact point on the boot joint will have the tendency to push the bassoon away to the right side. To prevent this the player could give the bassoon more inclination across the body until the balance point is found. The player should sit as tall as naturally possible, without tensing up, to bring the contact point of the thigh and bassoon lower. If the player feels that the instrument is either pulling to the front or towards him, putting weight on the left hand, he should move the contact point on the boot joint slightly towards the hip or knee, changing the angle in which the bassoon is held, until the balance point is found.

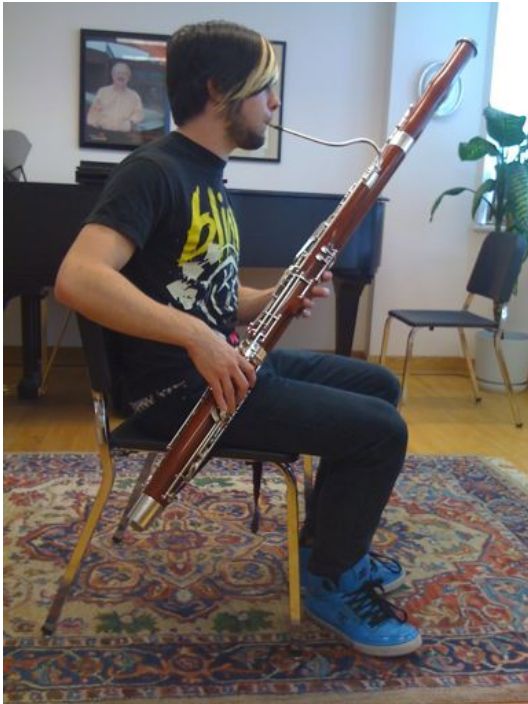


Image 54: Holding the bassoon closer to the hip and with more forward inclination. This position keeps the elbow with more bend and further back.



Image 55: Holding the bassoon closer to the knee and with less forward inclination.



Image 56: Giving the bassoon more inclination to the player's left side. More inclination is often needed when the contact point of the bassoon with the thigh is higher on the boot joint.



Image 57: Keeping the bassoon in a more vertical position to keep it from pulling to the player's left side.

William Dietz points out that shifting the angle of the bassoon can relieve the left hand from weight: "When the bassoon is held in a more vertical position (that is, a position in which it approaches a perpendicular angle to the floor), a great deal of the weight is shifted from the left hand to the seat strap."³⁹ Moving the bassoon towards the knee or hip without changing the place of the seat strap can help balancing the instrument by creating a counter pull. However, when moving the

³⁹ Dietz, 22.

angle of the instrument special attention should be placed on the embouchure, since bringing the bassoon closer to a vertical position also changes the direction of the reed in the mouth's cavity. Bringing the right leg up with a footrest could help achieve the right angle of inclination.⁴⁰

Legs and feet

When the bassoon player is tall the contact point on the bassoon and thigh will be low. The player will need to bring the instrument up to have the reed at the right height, causing the bassoon to pull to the left or front. Students may attempt to solve the problem by moving the bassoon towards the knee placing the seat strap closer to the edge of the chair and tucking the feet under the chair so that the thighs can hold the seat strap, however, the instrument will most likely continue to pull to the front, also causing the player to reach forward for the instrument.⁴¹

According to Richard J. Colwell placing both feet on the floor is part of a good playing position.⁴² Placing both feet on the ground is also essential when balancing the instrument, the feet should never be crossed or under the chair. Tall players will often find that when sitting their thighs will not rest properly on the chair, a similar position to someone placing their feet on footrests while seating. Often the solution employed is to cross the legs and slide them under the seat.

⁴⁰ Ibid., 23.

⁴¹ Ibid., 22.

⁴² Colwell, 164.

Tucking the feet under the chair results in a bad posture that often forces the player to lean forward making it very difficult to keep the instrument's weight off the hands. A better option to balance the instrument is to place both feet flat on the ground and sit all the way back on the chair without slouching, taking advantage of the chair's back support. The higher position of the thighs, which results from placing both feet flat on the ground, can help balance the instrument. It creates a higher contact point between the thigh and bassoon, pushing it back, like the effect created when using a footrest.

Playing standing up

Playing in a standing position is preferred when playing a solo recital. The most common problems of playing in a standing position are the tension caused by the weight of the instrument on the left hand, and the lack of space between the bassoon and the player's body. Many players attempt to avoid the problem by leaning forward standing on their toes, trying simultaneously to counter the weight on the left hand by placing the boot joint slightly in front of the right thigh.

Part of the solution to this problem is through the use of a balance hanger (a device installed on the bassoon that allows the option of attaching the neck strap or shoulder harness at different balance points). The balance hanger allows the player to keep the instrument from putting excessive weight on the left hand.

European bassoonists use a device that facilitates balancing the instrument when using a neck strap or shoulder strap called a distance guard. The device is a disc of about three inches in diameter with a metal pin in the center perpendicular to it, which is installed on the boot joint. The distance guard keeps the instrument away from the player's hip. When the distance guard is placed correctly it anchors the instrument against the hip keeping the instrument's keys from pressing against the body while also preventing the instrument from excessively pulling forward keeping the left hand from excessive weight.⁴³



Image 58: Bassoon with a distance guard made by Holden McAller and a fox balance hanger. Picture copied from Barrick Stees Blogs.

Depending on the height and physiology of the player, installing a distance guard may not be the best option. The distance guard is often installed on a section

⁴³ Leech, 11-13.

of the boot joint that is crowded with keys and mechanisms. In some cases the distance guard cannot be installed on the optimal place because of the many keys and mechanisms on the boot joint. An alternative to this is place a guard over the mechanisms keeping them away from the player's hip. This guard can also function as an anchor for the instrument as it rests on the player's hip. The guard also allows the instrument to remain closer to the body without affecting the operation of any mechanisms and keys (see image 50 in p. 71).

Hands and Wrists

Hand form and placement is very important for technical proficiency. The level of difficulty encountered in a vast number of bassoon orchestral excerpts and solo repertoire requires a consistent and fluent technique. This can be achieved in part through careful consideration of the placement of the hands and of the way in which the fingers move. After a good posture and balance of the instrument has been achieved finding the correct placement, form, and movement of the hands will be an easier task.

Once the left hand has been relieved from supporting excessive weight, the player should place the left hand on the instrument taking caution not to place it too high or low on the long joint allowing the fingers (especially the third and fourth fingers) to reach the keys comfortably without stretching. Players with smaller

hands often find that there is only one place on the boot joint on which they can place their left hand that will allow them to reach all the keys and tone-holes.

Keeping the fingers curved whenever possible can facilitate movement and avoid problems like locking joints, inconsistent technique, and injury. When the player's hands are small and impede him from curving his fingers, he might consider modifying his instrument so that the keys are placed at a more reachable distance.



Image 59: Stretching the third finger to reach the C tone hole.



Image 60: Elizabeth Burkhardt modified the keys of her instrument allowing her to reach them without stretching her fingers. A key that covers the C tone hole was added, the D-E flat trill key has been moved and the E flat and low C sharp keys have been moved up closer to the pinkie finger.

Jan Dommerholt recommends musicians to play paying careful attention at the way they form their joints: “In general, musicians should play with their joints as much as possible in the neutral position. A cellist bowing with the right wrist in flexion will need large muscular efforts to hold the bow because excessive wrist flexion will restrict the ability to grasp, increasing the risk of injury.”⁴⁴

When the bassoonist has large hands, there will be several heights at which the left hand can be placed on the long joint. Players with large hands are more likely to develop bad hand positions if they don’t have good instruction early on. The weight of the instrument forces many young players with large hands to place their left hand high on the long joint, with the fingers reaching down to the keys and tone-holes, to support the weight of the instrument with the opposite side of the index finger’s knuckle. This position often causes the fingers to be straight and tense

⁴⁴ Robert Thayer Sataloff, ed., *Performing Arts Medicine*, 2nd ed. (Sand Diego: Singular, 1998), 280.

making technique difficult and allowing for a high probability of injury. The first step in correcting this problem is to balance of the instrument correctly relieving the hand from excessive weight, after this has been achieved the player will have enough freedom to move the hand to a lower point on the long joint, allowing the same time the fingers to be curved and free the hand from any tension.

The right hand is not as problematic for most players as the left hand, since it does not have to support as much of the instrument's weight, even when the instrument is not well balanced. However, the 'neutral' curved form of the fingers in the left hand applies also to the fingers of the right hand. The player can use a hand rest (crutch) to avoid resting the index finger on the C-sharp guard, whenever hand size permits it.

Placing the index finger on the C sharp guard should be avoided because a great number of players develop numbness from the second phalanx to the tip of the index finger after playing the instrument in this manner for several years. The numbness is the result of nerve compression on the index finger. Nerve compression on the fingers is not a problem experienced only by bassoonists or players of other heavy instruments. Flute players often experience a similar problem. According to Norris, flutists often experience hyperextension on the left hand's index finger and compression at the digital nerve, resulting in numbness and pain: "Typically, the left index finger is hyperextended at the metacarpal joint. The flute is supported on the ledge that is formed. In this position, compression of the

digital nerve in the finger is quite common, resulting in pain or paresthesia, including numbness and 'pins and needles' in the index finger."⁴⁵

There must be a contact point between the right hand and the instrument at all times so that the hand does not lose its place when playing difficult passages with complicated fingerings. An alternative to the hand rest is placing a guard, like the guard used in contra bassoons, to act as a hand rest. This has been a solution for players with smaller hands allowing them to rest the hand on the guard. The guard keeps the hand grounded closer to the instrument than a hand rest and prevents the hand from stretching too much.

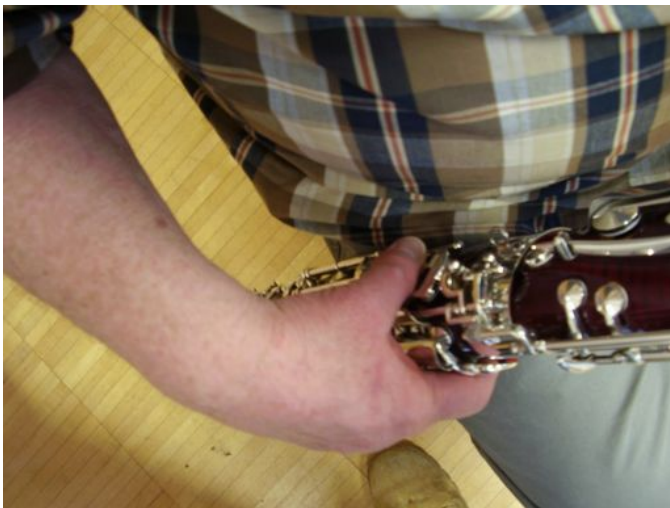


Image 61: Guard supporting the right hand. It allows the hand to rest closer to the instrument than when using a hand rest.

⁴⁵ Sataloff, 268.



Image 62: guard contacting the index finger above the knuckle. This guard allows Mr. James to keep the index finger from pressing against the C sharp trill key guard.

The crutch can also be used upside down depending on the size of the player's hand. Both wrists should be kept as straight as possible allowing for a very slight angle of bend. The right wrist may have a little more bend to allow the elbow to be down closer to the body, however, if possible the instrument should be rotated clockwise on the thigh to keep the right wrist at a neutral position. The right wrist is usually more problematic for bassoonists and is prone to injury when kept excessively flexed while playing.⁴⁶ Regardless of the position of the wrists, the arms and hands must be relaxed as much as possible to avoid injury. According to Norris, an awkward posture, which includes flexed wrists, accompanied with static load can cause permanent damage: "Considering the static loading in combination with awkward postures and the repetitive nature of playing music, musicians may be at

⁴⁶ William J. Dawson, "Ask the Doctor: Playing with Hand and Arm Pain," *International Double Reed Society* vol. 21 no.1 (1998): 90.

increased risk for possible chronic muscle damage, tendon inflammations, or nerve damage."⁴⁷

If the instrument has the tendency to rotate counterclockwise on the thigh a solution to counter this tendency should be found to keep the right wrist and hand relaxed. Allowing the instrument to rotate to the position where it naturally rests can make the right wrist flex causing tension when playing. A seat strap that anchors the instrument or installing a guard on the boot joint are alternative solutions to keep the instrument from rotating.⁴⁸

For technical proficiency and consistency the two pinky fingers (E-flat key on the left hand and F on the right hand) and the fourth finger on the right hand (G key) can rest on the keys while playing.⁴⁹ This can help the player establish a consistent travel distance for the fingers. When these three fingers are kept resting on the keys they anchor the hand allowing the remaining fingers to also stay on a consistent distance close to the instrument making finger coordination easier. Feeling the air stream with the tip of the index, middle and ring finger of the left hand and the index and middle finger of the right hand as it comes through the tone holes can also help the player keep the fingers at a constant distance from the instrument. As these fingers travel away from the tone holes, the airstream is felt on the fingertips allowing the player to sense how far the fingers travel from the tone holes.

⁴⁷ Norris, 262.

⁴⁸ See section on the instrument's rotation on pp. 38-41.

⁴⁹ Schaub, 121.

Final comments

Avoiding performance related injury takes awareness and action. Correcting bad habits sometimes means having to spend time re-training the body to perform with a different posture and even spending time with a therapist. Many successful players including Barrick Stees, Elizabeth Burkhardt and Michele Grego have spent time exploring the benefits of Alexander Technique, Body Mapping, Feldenkrais Technique and other body awareness educational systems. Developing good ergonomic habits is a goal for bassoonists in all stages and levels of playing.

Jan Dommerholt states the importance for musicians to carefully consider their playing habits: "It is helpful to be informed of the range of accepted pedagogical techniques and performance methods. There is much confusion and disagreement among music teachers, and medical practitioners can play an important role in further defining the biomechanical and physiological parameters of music making."⁵⁰ Musicians should not consider pain a natural part of playing an instrument, even at a very difficult level; pain is a sign of bad ergonomic and biometric habits.

For musicians, learning good posture habits from an early age should be an important part of their training. Careful consideration of the ergonomic and biometric principles involved in playing an instrument can prevent many performance related injuries.

⁵⁰ Sataloff, 280.

Robert T. Sataloff points out that the lack of ergonomic training in the pedagogy of instrumental music is surprising:

The novice in performing arts therapy may be surprised to learn that most music schools do not include subject regarding mechanisms and prevention of injury in the curriculum, although Spaulding has demonstrated that such a comprehensive teaching curriculum can reduce the incidence and prevalence of music-related injuries. Educating musicians may prevent future injuries and eliminate current perpetuating factors interfering with return to play.⁵¹

Bad ergonomics hinder technical development causing musicians to move their bodies in awkward ways. Instruments as ergonomically complex as the bassoon can be especially difficult to learn for beginning musicians without the proper instruction, as is often the case. Having previous experience with other instruments is beneficial, yet not sufficient to develop good posture and playing habits on the bassoon. However, With the proper ergonomic instruction, and the help from the growing field of Performing Arts Medicine, the beginning bassoonist can learn to hold the instrument with the correct posture, avoiding future technical problems and performance related injuries.

⁵¹ Ibid., 279.

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