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UMI®
WHAT EVERY FLUTE TEACHER NEEDS TO KNOW ABOUT THE BODY:
A HANDBOOK APPLYING THE PRINCIPLES OF BODY MAPPING
TO FLUTE PEDAGOGY

D. M. A. DOCUMENT
Presented in partial fulfillment of the requirements for
the Degree Doctor of Musical Arts in the Graduate
School of The Ohio State University

By

Eleanor M. Pearson, M.A.

* * * *

The Ohio State University
2000

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ABSTRACT

Body Mapping is a major contribution to the burgeoning field of injury-prevention and performance enhancement for musicians. The body map is the representation in one’s brain of how the body is put together. It contains specific information about structure, function and size. It may be congruent with the way the body is designed, or it may be at odds with that design. This map also governs a musician’s movement. If the map is accurate, the musician’s movement will be free, fluid and balanced. If the body map is inaccurate, the movement will be awkward and even injury-producing.

This illustrated handbook gives accurate anatomical information to help teachers learn correct Body Mapping as it relates to various aspects of flute pedagogy. Topics include standing and sitting, hand and arm use, and breathing. It also offers several exercises to help students incorporate this information into their playing, thereby reducing pain and injury and enhancing performance.
DEDICATION

Dedicated to my father, Robert Winsor Pearson

As a doctor and amateur musician himself,
he would have appreciated my forays into anatomy and music.
ACKNOWLEDGMENTS

There are many people without whose help this work would never have been done. I am deeply thankful to the following people for their support, thoughtfulness, and hard work:

Barbara Conable, who has served as teacher and mentor in my discovery of how to improve my own body use and of how to teach others these tools. She has also provided significant editing help.

Liisa Ruoho, who as teacher and colleague has offered many creative and supportive ideas on how to play, think and work as a musician and teacher. She has also given extremely generously of her time.

Katherine Borst Jones, who as my teacher and advisor at The Ohio State University has given unselfishly of her time and provided me with support, feedback and advice in my many endeavors.

William Conable, professor at The Ohio State University, who has served as teacher and a member of my doctoral committee, has prodded me to think beyond my own limitations.

Christopher Weait, professor at The Ohio State University, who has served as teacher and a member of my doctoral committee, has provided thoughtful and good-natured support, often going beyond the course of duty to help.

Amy Likar, flutist, colleague and friend, with whom I have discussed these materials countless times, contributed significantly to the original conception of this handbook and posed for several of the figures.
My parents, who supported me as a musician from an early age and have made many opportunities possible for me.

My husband, Tony McDonald, who followed me to Columbus and who has taken on all imaginable household, parental and spousal roles to help me achieve this degree. He has always given unwavering support for my work.

My sons, Carey and Peter, who have helped me by proofreading and giving computer advice, moral support and hugs, and who sacrificed having a mom for six months so I could study in Finland.

All the excellent flute teachers I have had, each of whom contributed in his or her unique way to my knowledge of flute technique: Sybil Miller, William Wittig, Adrienne Greenbaum, Elinor Preble, Doriot Anthony Dwyer, Frances Blaisdell, Clement Barone, Julius Baker, Trevor Wye, William Bennett, Liisa Ruoho, and Katherine Borst Jones.

I would like to extend a special thank you to my doctoral committee - Professors Jones, Conable and Weait - all of whom have contributed knowledge from their area of expertise and given generously of their time.
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FIELDS OF STUDY

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CHAPTER 1

INTRODUCTION

This handbook represents a synthesis of two fields that have, until now, remained relatively separate in published literature: flute pedagogy and the Alexander Technique. While many flutists have studied the Alexander Technique and Body Mapping (a branch of the Technique), few have presented this information in a pedagogical format. It is the intention of this handbook to present principles of Body Mapping as they relate to important issues of flute pedagogy.

The work represented in this handbook is the offspring of several generations of work by many people in the fields of somatics and music. Early in this century, F. M. Alexander discovered the reflex of primary control and gave us the tools with which to access it.¹ He was a pioneer in somatics, the integrated study of disciplines of or related to the body. Over the past few decades many branches of this field have developed, each making a unique contribution to understanding how the body works. We now know the importance of attention to the use of the body for enhancing activities such as playing an instrument.

In the field of music performance, increasing attention has been paid to the mind-body connection. Of particular interest to performers is the work on injury prevention and treatment and performance enhancement. Eloise Ristad’s seminal book A Soprano on her Head (1982) introduced many concepts of performance enhancement. More recently, Julie Lyon Lieberman’s You Are Your Instrument (1991), Dr. Richard Norris’ The Musician’s Survival Manual: A Guide to Preventing and Treating Injuries in

¹ Primary control is the set of inherent reflexes in the body which allows for effortless uprightness. Alexander’s method of accessing it, called the Alexander Technique, improves kinesthetic awareness and enhances ease, flexibility, balance and support in movement. See Chapter 4 for more information.
Instrumentalists (1993), Elizabeth Andrews’ Healthy Practice for Musicians (1997) and Madeline Bruser’s The Art of Practicing (1997) have combined these and other insights with practical physiological information about preventing injuries. Other articles and publications proliferate on the Internet, where there is an extensive site devoted to musicians and injuries as well as numerous other sites on mind/body work. But Body Mapping, the crucial piece of information which could maximize the effectiveness of much of this useful work, has had little exposure. A clear understanding of how musicians can use Body Mapping is an important and developing area.

First articulated by William Conable, Professor of Music at The Ohio State University, the concept of Body Mapping is a tool which makes somatic work easier to integrate into any activity. Barbara Conable has applied this concept to the teaching of musicians with her book and accompanying course What Every Musician Needs to Know about the Body: The Practical Application of Body Mapping and the Alexander Technique to Making Music. Her work seems to indicate that the body map has a direct effect upon musicians’ success. Adapting this knowledge to the specific technique of individual instruments is a next step in making this important information accessible to musicians at all levels.

Flutists in particular suffer from many physical maladies, which have been extensively documented in the literature of performing arts medicine and flute pedagogy. Helping flutists to develop an accurate and adequate body map is often a productive way of both preventing and helping to heal these injuries. This handbook incorporates

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3 Musicians and Injuries: www.engr.unl.edu:80/ee/eeshop/music.html

4 Barbara Conable and William Conable, How to Learn the Alexander Technique, 3rd edition, revised and enlarged (Columbus: Andover Press, 1995).

5 Barbara Conable, What Every Musician Needs to Know about the Body (Columbus: Andover Press, 1998)

principles of Body Mapping into important aspects of flute technique, thereby offering a new resource for teachers.

The material in this handbook derives from several sources. The information on anatomy is common medical knowledge; the intent here is to be anatomically correct without using medical terms that may be confusing. Specific sources include The Body Moveable by David Gorman, Atlas of Human Anatomy, by Frank H. Netter, M.D. and Learning Human Anatomy, by Julia E. Guy, as well as What Every Musician Needs to Know about the Body. Material in Chapters 3, 4 and 5 is also taken from What Every Musician Needs to Know about the Body and How to Learn the Alexander Technique by Barbara Conable and William Conable.

The exercises in this handbook come from many sources: from my flute teachers, from my own experience teaching, and from conversations with other flutists and with Alexander Technique teachers. To state the origin of each exercise would be impossible, but many come from the creative teaching of Liisa Ruoho, flute professor at the Sibelius Academy in Helsinki Finland, with whom I have studied periodically during the last fifteen years. An extended stay in Helsinki under the auspices of the Fulbright program gave me an opportunity to work closely with her in 1998.

Other people whose work contributed to these exercises are Katherine Borst Jones, Professor of Flute at The Ohio State University, whose thoughtful and open-minded teaching provided a forum for me to discuss my ideas; Amy Likar, a flutist and Andover Educator who shares my interest in making these tools available to flutists; and Barbara Conable, whose clear and practical work in the Alexander Technique and Body

---

7 All terms are defined in the Glossary of Medical Terms at the end of the document.
9 Barbara Conable and William Conable, How to Learn.
10 The author is not a teacher of the Alexander Technique, but is certified to teach the Andover Educators course “What Every Musician Needs to Know about the Body.”
11 Andover Educators are musicians who are trained to teach the above course.
Mapping has saved the careers of hundreds of musicians from ending prematurely due to pain and injury.

Illustrations come from two sources: What Every Musician Needs to Know about the Body\textsuperscript{12} and photographs, which have been modified into drawings by computer, taken by myself.

The information, exercises, suggestions and illustrations contained in this handbook are those I have found most useful in over twenty-five years as a professional flutist and teacher. As flute pedagogy widens to include techniques and philosophies from many different approaches, the need for a productive exchange of ideas has increased. This handbook is intended as a catalyst for an improved exchange of ideas on the subject of viewing flute pedagogy in the context of the whole body. It is hoped that more flutists with experience in this area will contribute to the development of this approach.

\textsuperscript{12}Conable
CHAPTER 2
HOW TO USE THIS HANDBOOK

A. A resource

As a flutist who has traveled the road from discomfort, injury and frustration to comfortable, free and fluid playing, I have often wished there were a resource which would explore flute technique from the perspective of Body Mapping. While I studied with many excellent flute teachers, none of them could help me with the pain that started in my hand at age eighteen. Eventually I began studying the Alexander Technique. Although the pain lessened and my body use improved, my Alexander teachers were not flutists and could not help me directly with flute technique.

Flutists in general have many common problems which could benefit from such a resource: overwork of the head, neck and arms; lack of support from the whole body; back pain; and limitations in breathing. To help solve these problems, this handbook offers an introduction to Body Mapping in conjunction with a set of exercises which can aid students in changing unproductive habits.

B. Structure

Each section contains several parts: basic information on the mapping issues for that area of the body, exercises to help you explore this information (these are in italics) Teaching Tips - ideas that may be useful in a teaching studio; and

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13 More comprehensive pictures and information are available in any of the anatomy books in the Bibliography.
Helpful Fantasies - ideas or images that have been useful to some people.

In approaching the exercises, it will be helpful to work with your flute in hand as much as possible. The closer you are to the instrument, the easier it is to translate into playing the skills gained and to demonstrate them to students. Consider the exercises merely as a starting point. Since each body is different, see how your own body works and notice its responses. The goal is not to achieve the exercise but to learn more about yourself. You may find that an exercise works for something completely different than its stated intention.

In any movement or exercise, think of the direction you are going. For example, if you are raising your arm out straight to the side think of the arm, from the shoulder blade to the finger tips, as the radius of a circle. Imagine the arc your fingertips will make as you raise you arm. If you are standing up from a seated position, think of the direction your head is going. Think also of exercises you have done in the past that felt good - then do those with the increased awareness you are gaining by studying Body Mapping.

C. Exploration

Explore the range of "free," "tight" and "rigid" muscle use with your students. Free movement is done by muscles which can contract or extend without resistance from other muscles. Tight movement occurs when opposing muscles contract at the same time, causing some degree of tension (called co-contraction). Rigid movement occurs when tension in co-contraction is extreme. Consider these examples:

- Free movement: move one arm in a very free manner at all the joints so it feels fluid and supple. When you bend (flex) it, you are contracting the biceps muscles; when you straighten (extend) it, you are contracting the triceps muscles. Other muscles perform other activities such as rotation.

- Tight movement: tighten your arm muscles slightly and move your arm again: it will feel stiff and less supple.

---

14 These suggestions are ideas that may help you understand a concept, though they may not correspond exactly to our physical structure. If they make sense to you, use them. If not, discard them.

15 "Relaxed" is not a useful term here, as it implies slumping to many people.
• Rigid movement: tighten your arm muscles strongly: your movement will feel jerky and very stiff.

A student may be at any place on this continuum from free to rigid. If she is already very free, she can use information on Body Mapping to understand what she is doing well and eventually to help her future students. A student at any other point on the continuum can be helped to become freer, improving flute technique and expression.

Encourage a spirit of discovery in your students. This approach may at first be disconcerting, especially to those who are not used to thinking about their bodies. Help them to appreciate every new bit of freedom they gain. As they incorporate it into their playing they will learn new things about their bodies, journeying on a path to more freedom and to musical and physical integrity.

This handbook is for teachers, because teachers guide the next generation of players. It is equally helpful, however, for players who want to work on their own or under the guidance of a teacher. ¹⁶ It is important to remember, however, that in the study of an instrument or any aspect of movement there is no substitute for personal experience with a teacher. Any interested reader is encouraged to seek out some direct study with a flutist who understands the principles of Body Mapping or with a teacher of the Alexander Technique.

You can use Body Mapping as a guide to help you resolve conflicting pedagogical information, such as recommended standing positions or a tight versus relaxed embouchure. Examine the issue from the point of view of how the body was designed to function and what approach would involve the most efficient use of the body with the least amount of extra work. (See Chapter 6 for a discussion of standing positions and Chapter 9 for a discussion of embouchure.)

¹⁶ For the sake of expediency, most exercises are addressed in the second person, to you. For clarity, a few are addressed to the third person, the student. Gender references are divided between male and female.
As you read this handbook you may find that your awareness of your body is improving. A good musician, ultimately, should have as much awareness and understanding of his body as he does of pitch or of rhythm. The same refined process used to notice and correct out-of-tune notes can be used to notice and correct balance that is off or awareness that is incomplete.
CHAPTER 3

BODY MAPPING\textsuperscript{17}

A. What is a body map?

Your body map is the representation, within your brain, of your body. This includes general concepts like how big you are, as well as highly specific ones like where the joints of your fingers are. It is learned over time and is based on your experience and movement. It can change as you grow. It is often unconscious, but can be accessed through patient inquiry.

For example: take out a plain piece of paper and draw your idea of what your hip joint looks like - how you think your leg attaches to your pelvis. If you have not thought about this before it may take some time, but if you are patient you will discover what you think. The image you use will have been learned from your own experience sitting, walking, bending, etc., as well as your observation of other people's movement. This is your own unique map of your hip joint; it is probably different from your neighbor's map of his or her hip joint.

B. Brain maps

Our highly complex brains contain many such maps. There are several sensory maps that we use all the time including, for example, visual maps of distance and shape. Because our bodies grow and change, our body maps grow and change over time. This means that even if we have developed faulty aspects of our maps, we can learn to change

\textsuperscript{17} The information in this section is adapted from Conable, \textit{What Every Musician} and Conable \& Conable, \textit{How to Learn}. Please consult these books for more detailed information about Body Mapping.
them at any age. As neuroscientists become more sophisticated in studying the brain, they will be able to tell us more about how these maps function and how they develop. For the time being, it is enough to know that they exist and have significant influence in our daily life.

C. Structure, function and size

The map of any particular aspect of your body contains the elements of structure, function and size. For example:

- What is the structure of the spine: what is it like? Is it segmented or rod-like; curved or straight; mobile or rigid; and located in the front, middle or back of the body?

- What is its function: what does it do? Does it bend and twist, lengthen and gather, support weight, and support other parts of the body?

- What is its size: how big is it? Is it the size of a dime, or a quarter, or a dollar bill? Does it go from the base of the skull to the tailbone?

The answers to all these questions are contained in your map of your spine.

D. How the body map affects movement

The most important reason for studying Body Mapping is this: your body map governs your movement. Like a road map, you follow it as you go about your daily life. If your map is accurate and refined, your movement will be fluid and free, balanced and expressive. If your map is slightly inaccurate and inadequate, your movement will be slightly awkward. If your map is very inaccurate or missing significant parts, your movement may be painful and injury-producing.

In short, if you move in a way that is consistent with the way the body is designed, you will perform your activities easily. If you try to move in a way that is different from how the body is meant to function, your movement will be done with difficulty. The body map will always determine the quality of movement.
For example: The torso is designed to move as a whole from the hip joints.

A flutist who has a complete understanding of the hip joints and the range of motion available in the lower torso will bend, twist and spiral in many expressive ways. He may move dramatically or subtly, but the movement and freedom will be apparent.

A student who does not understand this use of the hip joints or where they are located may look awkward in his movement. He may try to move from the waist or lock his knees to create stability. He will be limited in breathing, as the abdomen cannot expand freely. He will also be lacking the leg support necessary for clear high notes and easy pianissimo. Over time he may develop knee or foot problems.

Another example: The chest area is wide and deep, allowing plenty of room for ribs to move freely and for the arm structure to float over the ribs.

A student who is a swimmer may have very clear maps of arm structure and the width and depth of the chest. She will breathe easily and her ribs will move freely. She will also hold the flute without extra effort and feel the connection of her arms to her whole back.

Another teenage girl, having learned to be self-conscious about her developing body, may try to make herself smaller than she really is. She may pull her shoulders in and up and cave her chest in slightly. Her body map is one of narrowness through the whole upper torso. She will have difficulty breathing and limited use of her arms. She may also develop numbness in the hands or tendinitis. These problems develop because she is trying to make her body fit a map which is different from the reality.

The human body is designed to support the kind of large and small repetitive movements that musicians need to make. However, if the body map is faulty in any one of the areas of structure, function or size, these movements can be unnecessarily painful. By understanding how the body is structured, how it works and what size it is, musicians can improve their playing and their health.
E. How to change the body map

Since your body map was learned, it can be changed if necessary. When you discover, for example, that your idea of how the wrist moves is inaccurate, you can change that idea and improve the flexibility of your wrist. The following steps are suggestions of how to go about changing your map:

- Become conscious of your map. Ask yourself many questions about structure, function and size, until you discover what your ideas are. For example, go back to the picture you drew of the hip joint and study it.

- Learn the correct structure, function and size of the body part. For example, study the picture of the hip joint in Figure 8.

- Compare that picture with your drawing of your map until you fully understand any differences between them. Incorporate the correct map into your thinking.

- Cultivate your awareness of that body part, so that you learn clearly how you use it well. For example, notice how you use your hip joint when walking and sitting, as well as while playing the flute. Notice also how its use improves as your map improves.

- Put that part in the context of your whole body, becoming aware of how it affects the rest of your body. For example, notice how your head/neck relationship affects your use of the hip joint.

- Use your movement sense\(^\text{18}\) to give yourself continuous feedback on how you are moving. If your movement is stiff or uncomfortable, become aware of when that happens and remind yourself that you have a choice about how to move. If your movement is free and fluid then congratulate yourself, reinforce the thinking that got you there, and remember how it feels so you can do it again.

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\(^{18}\) This is also called your kinesthetic sense and will be discussed in more detail in Chapter 5.
Ensuring that your body map is accurate and adequate is one of the most powerful tools you have to improve and enhance your ability to play and perform on an instrument. This handbook is designed to help you discover that process.
CHAPTER 4

PRIMARY CONTROL\textsuperscript{19}

An aspect of Body Mapping that flutists need to understand better is primary control. Primary control is the term F. M. Alexander used to describe a phenomenon he observed in himself and his students. It is the inherent set of postural reflexes\textsuperscript{20} in the body which allows for effortless uprightness. It is enabled by a dynamic relationship between the head and the neck, beginning with freedom at the A.O. joint\textsuperscript{21} and reflected throughout the spine. It is shown in “natural” athletes, musicians and dancers by the look of effortlessness, freedom, poise and balance which they exude. Wynton Marsalis, Gene Kelly, Michelle Kwan and Michael Jordan are all examples of people with excellent primary control.

Because these reflexes create support for the whole body along the core of the spine, the movements of every limb and of breathing are coordinated. Primary control helps a person use the body in mechanically advantageous ways, i.e., in accordance with its design. This sense of support within the body is one of liveliness, buoyancy and dynamic and powerful movement.\textsuperscript{22}

\textsuperscript{19} The information in this section is adapted from Conable, \textit{What Every Musician} and Conable & Conable, \textit{How to Learn}. Please consult these books for more detailed information about primary control.

\textsuperscript{20} Postural, in this sense, means what keeps us upright, not an erect or rigid position.

\textsuperscript{21} This is the Atlanto-occipital joint, where the base of the skull meets the top of the spine. See Figure 2.

\textsuperscript{22} Several scientific studies have demonstrated the existence of this phenomenon. See Frank Pierce Jones and J. A. Hanson, “Time-space pattern in a gross body movement.” in \textit{Perceptual and Motor Skills} 1961, 12, 35-41. Two books citing other studies are listed in the Bibliography: Jones’ \textit{Freedom to Change - The Development and Science of the Alexander Technique} (London: Mouritz, 1997) and Chris Stevens’ \textit{Alexander Technique}, illustrated by Shaun Williams (London: Macdonald and Co., 1987).
Without good primary control, there is a feeling of effort in holding the body up. Instead of moving freely in relationship to the ground, which is our source of stability, a person may need to create an alternate feeling of stability by tensing some part of the body. Such tightness can diminish support for breathing and for free movement of the arms and legs, also compromising a person’s full stature.

Other things can interfere with primary control. Loss of freedom in the head and neck will take away their dynamic relationship, thus limiting the flexibility and support of the spine and creating a pattern of tension throughout the whole body. Inaccurate Body Mapping can also create poor body use or patterns of tension that interfere with primary control.

An experiment to find primary control
Try rolling a small ball the size of an orange (or a Koosh ball) under the ball of your foot. If you stay aware of your whole body, you may feel a little “zing” up the front of your spine. This is the reflex of primary control. It gives the “spring in the step” and allows your spine to lengthen along the core. See also the exercises accompanying Figures 55 and 56.

How to recover optimal primary control
All of us had beautiful primary control when we were children. Unfortunately, some of us have learned patterns of movement which interfere with its optimal functioning. Recovering full use of primary control is like visiting someone you have not seen in years: it may take a while to get used to each other, but soon you will pick up where you left off. One of the best methods of enhancing primary control used by many people is study of the Alexander Technique. The Alexander Technique improves kinesthetic awareness and enhances ease, flexibility, balance and support in movement.

23 See Resources.
You can approach learning about primary control the same way you learn correct Body Mapping. Primary control can be mapped as a function of the spine and spinal muscles. A more explicit description of the function of primary control is conveyed by Barbara Conable in “The Laws of the Spine.”

1. The head must lead spinal movement (as it does in all creatures). This is why the neck must be so free, so that it doesn’t interfere. The spine is an ensemble. It plays all together with the head conducting.

2. The vertebrae must follow in sequence (politely).

3. The spine must be free to lengthen and gather in spinal movement, not just bend and twist (the lengthening and gathering is part of the spine’s natural resiliency, and it supports and coordinates the movement of the limbs).

4. Spinal movement should be distributed across the whole spine, not concentrated in part of it.

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24 See “How to change the body map” in Chapter 3.
25 Conable. What Every Musician. p. 89-93. This section contains many excellent suggestions on recovering primary control.
CHAPTER 5
ON ATTENTION AND THE SENSES

One of the best tools a musician can use to improve her playing and access primary control is an inclusive attention. Inclusive attention stimulates the reflexes of primary control and gives the musician access to information from her whole body. An inclusive attention is one that includes information from all the senses. While musicians are generally trained in the use of visual and auditory senses, they are often less developed in the tactile and kinesthetic senses - the most important senses for telling you how your body moves and feels. Practicing inclusive attention can help develop the kinesthetic sense.

The kinesthetic sense tells you about your movement - its position, size and quality. For example, if you put your hand above your head where you cannot see it, you still know that it is there. You can tell where it is, how big it is, whether it moves and how it moves - with fluidity or stiffness. The receptors for this sense are in the muscles and the connective tissues near the joints.

Your body map is the representation of the kinesthetic sense in your brain. A person with a highly developed kinesthetic sense is more likely to have a clear body map than someone with an unrefined kinesthetic sense. By developing your kinesthetic sense, you can become as sophisticated at sensing balance, small tensions and qualities of movement as you are at sensing minute pitch variations.

This is of tremendous importance because the quality of your movement determines the quality of the sound you make. In general, fluid and supported movement...
produces a full, rich and free sound. Tight or rigid movement tends to produce a sound lacking in depth and in the full range of tone colors. This is true whether the instrument is the flute, violin or voice: the resonating chambers are affected by the quality of the tissue around them and whether it is free all the way from the floor. An inclusive attention helps you to embody the sound - to produce sound with your whole body - because you are using your whole body.

When a musician narrows his attention to include only the page of music in front of him, he tends also to limit the range of his movement and to experience some tension, especially in the upper body. The process of playing this way can be exhausting and unproductive. Imagine instead an attention that includes everything around him - the stage, the lights, the brass section, the conductor - and him sensing it all, fluidly shifting his focus from one to the other, never losing his sense of the whole. This kind of inclusive attention is rewarding and supports fine playing.

Here is an example: if you try concentrating on just one thing - this text, for example - and blocking out all other things, you may notice yourself feeling a little narrower. If you then open up your attention to everything around you as well - your senses, how you are sitting, the room you are in, the building you are in, etc. - you may feel a small release, an easing into a more comfortable state. In this state you have more access to primary control and to the use of your whole body.

**Teaching tip**

To help refine your observation of a student’s quality of attention, try the following. Ask a student to play while narrowing her attention to include only the page of music she is playing. Then ask her to include her whole self and everything around her in her attention while she plays. Notice the small changes in movement, aspect and tone that take place. If you try this with several students you will soon be able to readily identify narrow versus inclusive attention.
When inclusive attention, good primary control and clear Body Mapping are in place, the body can truly take advantage of good balance. Balance is a fluid state in which the body does its work most efficiently and effectively. When the body is in balance, the parts of the body are in balance in relationship to each other and to the floor. A flutist who is out of balance puts pressure on torso, leg, arm and breathing muscles, thus limiting her ability to progress.

While the whole body is involved in creating balance and there are many small ways in which the body can go in and out of balance, it is most useful to look at a few major places of balance. Since movement can occur only at joints, these places consist of joints where we notice most clearly when the body is in or out of balance.

Figure 1 shows the important places of balance:

- the head/spine joint (the Atlanto-occipital joint)
- the spine (with attention to the thoracic and lumbar vertebrae)
- the hip joints
- the knee joints
- the ankle joints
Notice the line of balance that goes through the core of the skeleton. The centrality of this architecture provides the stability and flexibility we need for staying in balance. Good balance at all these places is essential for finding a free and comfortable way of standing.
A. Standing

Let's explore standing by way of examining the places of balance.

1. Head/spine joint

The most important place of balance is where the head balances on the spine, or the A.O. joint (Figure 2). Since flexibility at this joint and in the neck is essential for embouchure work, pitch control and tone color, flutists must identify, locate and free this joint over and over. Often when we try hard (to play soft, loud or high, for example), we tighten the muscles around this joint slightly. When these muscles tighten, mobility and flexibility are limited. Moreover, the loss of freedom in this joint is reflected in the rest of the spine by decreased flexibility and mobility, which in turn lessen the flexibility and range of motion of the limbs.

To see examples of good head/neck balance, go to a playground and watch little children. They balance their rather large heads perfectly easily and without straining any neck muscles.

![Figure 2: The Atlanto-occipital joint](image)

Figure 2: The Atlanto-occipital joint
Learning to release the head/spine (A.O.) joint

Tighten up the back of the neck very slightly by pulling the back of your head down (so that the chin goes up) and hold for a few seconds. Then, while being aware of your whole body all at once, release the neck muscles and allow your head to float up. Notice the feeling in the rest of your spine - you may feel a response all the way down to your tailbone, or only a few vertebrae down. The more often you do this, the more likely you are to feel the response in your whole spine.

Loosening tight neck muscles

Sitting in a comfortable position, drop your head easily at the A.O. joint and let it hang for a few minutes, allowing it to drop more as the muscles release. Again, feel the response in the rest of your spine. Do it a few times every day (or whenever you are waiting for a stop light, in the bathroom, waiting for web sites to download, etc.) As you allow it to float back up, keep the neck muscles (front, side and back) long and free. (See Chapter 9 for more on head/neck use.)

Teaching tip

Before trying to correct tone, intonation, or position problems, look for a good balance of head and neck. Have your student put her fingers gently in her ears, and show her pictures of where the A.O. joint is located - between the ears and in the center of the head. Ask her to make small and delicate movements of the head in all directions, and watch to see if the movement looks free or slightly stiff. (If it is very stiff she will need a lot of help freeing this joint.) Then have her tighten the neck muscles slightly and try the same movements: see if she can feel a difference in the quality of movement. Any perception of that movement quality, however slight, is a foundation you can build upon.

Many students drop their heads slightly or push their necks forward more than is necessary (often called the “turtle” position). When a student is told to raise or lower her head without first coming to a balanced position, she may pull it up by tightening more
neck muscles. While initially this may look better, it does not address the cause of the problem (lack of balance through the core) and may lead to more problems, such as tighter arms.

Figure 3: Head off balance

Figure 4: Head in balance

Helpful fantasy

The head should feel very easy and free, floating on the top of the spine with the fluidity of a well-oiled machine bearing.

2. The spine

The whole spine is involved in the balance of the body. If its length and flexibility are compromised at any point, the balance of the whole body is affected.

When the spine is in balance, it feels long and flexible. The head, neck and thorax are balanced through the lumbar spine; the sacrum (the lowest five vertebrae) is suspended between the pelvic bones. When the head goes off balance, the spine tends to
shorten and become less flexible. Its natural curves - in the neck, chest, lower back and sacrum - are exaggerated.

The thoracic spine supports the ribs and provides balance through the upper torso. When there is lively and fluid support through the whole spine, the thorax is quite flexible and moves easily in breathing.

Another important part of the spine is the lumbar spine, or the five vertebrae of the lower back (shown in Figure 5). This area is the source of much tension and back pain, often because people try to use the back half of the spine to balance themselves, rather than the front half. Many young flutists, for example, pick up their flutes and promptly settle their upper torso onto the lower back, bending slightly backward. They don't have a chance to get proper balance through the hip joints and legs because they've already stiffened their spine in a place where it needs most to be lively and flexible.

A close look at the five lumbar vertebrae in Figure 5 shows the front and back halves of the vertebrae. The back half houses the spinal cord and other nerves. It protects the nerves and provides a channel through which they can travel. (Often we map the bones we see on our backs, the processes of the vertebrae, as the whole spine. It is important to remember that they are only a small part of the spine.) The front half of the spine, which extends several inches into the torso, is the source of balance. There are dozens of little muscles which connect the vertebrae and help the whole spine to keep us upright. This is the core of the body which provides the lively support for all the limbs and the ribs.
Processes of spine

Back half

Front half

Sacrum

Tailbone

Figure 5: The lumbar spine: front half of vertebrae bears weight, back half houses nerves

In the following exercise, notice how a change in your thinking can change the way you balance yourself.

Finding the support through your lumbar spine. Sit comfortably, balanced on your sitting bones.²⁸

- Imagine that your back muscles are holding you up, and show that in the way you sit.²⁹
- Now, imagine instead that the front half of your spine, between where the side seams of your clothes are, is supporting you from the chair or floor. Feel balanced right through the core - the middle - of your body. Does this feel qualitatively different? You may feel your back muscles release and lengthen a little.

²⁸ If you are not sure how to do this, see the section on sitting, below.

²⁹ Be aware that some people think the opposite, stiffening the abdominal muscles in an effort to hold up the torso.
Discovering how the front of your spine supports you will give you increased flexibility and freedom, especially in breathing, and help you deliver weight properly into the legs and feet. (See Figures 6 & 7)

Figure 6: Balance behind sitting bones and lumbar spine

Figure 7: Balance over sitting bones and lumbar spine

Teaching tip:

In flute choir rehearsals, do you notice people stretching, rubbing their backs, or leaning over during rests or breaks in the music? These are people who probably are trying to use their back muscles to hold themselves up, thereby tiring those muscles. Spending a few minutes of each rehearsal exploring balance will give them an opportunity to discover their own balance. (Try the exercises in this section with them.)
3. Hip joints

Examine Figure 8 closely to see whether it matches the body map of the hip joint that you drew in Chapter 3.

![Figure 8: Hip joint](image)

Balance at the hip joints serves two purposes: allowing free movement of the torso at the joints, (such as bending over) and allowing free movement of the legs (such as raising the knee). The pelvis is beautifully designed for spreading the weight of the upper body into the legs, ensuring that the whole of the torso will be able to take advantage of a dynamic and fluid support through all of the six leg joints (hips, knees and ankles on both sides). Look at Figure 9 to see how weight is delivered diagonally from the spine through the pelvis and into the hip joints. Good balance at the hip joints depends on a clear map: movement in many directions is possible at this joint and is a great deal of fun to explore.
Finding the location of your hip joint

Experiment with different ways of walking to see how your map of hip joints affects you.

- First try walking as if your legs were attached to the inside of your pelvis.
- Now try thinking of them as attached lower than the sitting bones.
- Now try placing them in your mind exactly as you see them in Figure 9, on the side of the pelvis and higher than the sitting bones, also imagining the sacrum as suspended between the two halves of the pelvis.
- If you wear jeans with riveted pockets, the pocket rivet near the side seam may be at the location of the hip joint.
- Try raising your knee, feeling with your fingers the place where the leg bone moves.
4. The knee joints

The knee joint is where the upper and lower leg bones meet. The kneecap is there to protect the joint, but is not actually part of the joint. Balance here is essential for good standing. There are three positions of the knee joint: bent, locked, and balanced. A person with good balance will move between bent and balanced often, but rarely into a locked position.

Figure 10: The leg

Figure 11: The positions of the knee joint
Teaching tip

If a student can stand only with locked knees, he will need some help exploring balance of the whole body. Standing with knees locked is common among students who do not understand the support of the spine through the core of the body. They lock their knees as a protective mechanism for the lower back, which is unfortunately doing all the work of supporting the torso. Before asking them to unlock their knees, spend some time exploring core support and the balance of the torso over the hip joints. When they can squat comfortably, then they are ready to think of the whole torso as balancing over the hip and knee joints.

5. The ankle joints

The ankle joint is where the lower leg bones meet the top bone of the foot. The bones you feel on the sides of your ankle are the bottom of the leg bones; they curve slightly over the top of the foot bones. The ankle joint must be flexible to allow the leg free range of motion while standing. The ankle balances through the arch of the foot. Students who think they should balance at the heel instead look as if they’re leaning back slightly. This imbalance tightens the calf muscles and Achilles tendon and is part of a whole pattern of leg tension which is created when the body is out of balance.
Finding a good standing balance.

- Keeping your neck and head as free as possible, and thinking of support through the core of your body (as in Figure 7 above), allow the floor to support you. This may release some muscles that were unnecessarily working to hold you up.
- With your feet parallel and about hip distance apart, begin to sway in small circles from the ankle joint. With the head leading, move your whole body as one unit from the ankles. Be careful to keep the hips and head in line.
- Allow the circles to get bigger, but not so big that you feel that you’ll fall over. Keep feeling the fluidity of your ankle joints and dynamic support throughout the body.
- Gradually decrease the size of the circles, until you come back to a standing position. Notice where you are now balanced, and see if it is different from your habitual balance.

One useful way of understanding the places of balance is to examine the way the weight of the head is delivered through the body. (Refer to Figures 1 and 2 for this discussion.) The parts of the body that are designed for weight bearing are easy to see: they are all bones that are thick or large. The head (20-30 pounds) balances over the spine: the top vertebra of the spine, the Atlas, is quite wide and it is thick at the places where the skull rests on it. As the weight of the skull is delivered through the spine it reaches the thickest part, the lumbar spine. Here the vertebrae, 3-4 inches deep, are located almost halfway into the middle of the abdomen, providing secure support for the whole torso.

The parts of the pelvis where weight is delivered through to the legs are quite thick, whereas other parts of the pelvic bones are quite thin. (See Figure 9.) The ball of the femur, where it joins the socket of the pelvis, is also very thick. All of the leg bones thicken and widen at the points where they bear weight: at the knees and at the ankles. Note in Figure 10 that the large lower leg bone, the tibia, is designed for weight bearing, while the smaller one, the fibula, is thin and does not bear weight. You can feel the front of the tibia by finding your shin bone. In standing, you should feel weight being delivered
through the knee joints, through this bone in the front of your leg and into the ankles. As the weight is delivered into the foot through the arch, it then spreads equally to the ball of the foot and the heel. As you walk, the bones of the foot spread out, and the toes are used as levers to help propel you into your next step.

An interesting aspect of analyzing weight delivery is that when you are well-balanced through the core of the body, you will feel not weight but support. A feeling of weight, heaviness or effort is a sign of the body being out of balance.

Examining support from the ground up is another useful way of thinking about the places of balance. The floor or ground supports your feet, which are flexible and lively. There is a reflex in the ball of the foot that causes the spring in your step and creates a lively feeling along the whole spine. As the support goes up through the ankle, through the leg bones and the knees, it allows flexibility and freedom of movement at the hip joints and through the lower torso. This buoyancy continues through the whole spine, supporting the ribs and arms, as well as up through the neck, allowing the head to move freely.

Lively and supple balance is a combination of all these things, making it possible for the body to play an instrument for hours, run a marathon or dance a whole ballet. You can help almost any student improve her balance by understanding this process.

**Teaching tip**

What is the best standing position for your students? That may depend on the individual. The easiest way to find balance for most people is with both feet parallel, about hip distance apart. Have your students explore support and weight delivery equally through both feet from this basic position.

Once balance is found, it may be more comfortable for some to use a different position, such as placing one foot slightly in front of the other. The danger of adopting a stance before finding balance, however, is that sometimes people try to maintain the position without paying attention to their balance. If they stand with the feet turned out,
for example, this can initiate a pattern of leg tension which torques the legs out and tightens the gluteal muscles, thereby limiting free leg movement and deep breathing capacity. (See section on gluteal muscles in Chapter 10.) If they put too much weight on one foot, they may stiffen those leg muscles to keep their balance. Watch your students’ use of their legs: if the legs seem rigid, students will need help exploring the places of balance.

Good balance in standing comes from balancing the body around the core of its support, the spine. The spinal muscles have reflexes to keep us upright. Releasing tension in the outer body muscles (such as arm and leg muscles) allows the postural spinal muscles to do their job. A very free player can stand in almost any position, because she is using the structure of the body to balance herself and has good support and flexibility throughout the spine. She can go off balance and come back into balance, maintaining her primary control and freedom of movement.

B. Sitting

Well-balanced sitting is as important to free breathing as it is to good hand position and free use of the arm structure. Balanced sitting includes finding the sitting bones or rockers and balancing the whole torso and head over them. The legs are free to move or stay in place, but they are always included in the player’s awareness. The upper body can move around on the sitting bones in many directions, but always in a way that allows the back and abdominal muscles to be free, the arm structure to move freely and the head to be balanced easily on the spine. Sitting off balance can lead to pulling the arms in and down, thereby limiting finger movement and sometimes causing tendinitis and carpal tunnel problems.

30 See Chapter 4 on primary control.
Finding the sitting bones (rockers) (See Figures 13-15.)

1) On a fairly firm chair, move slowly between sitting up too straight (arching lower back, chest out) and slumping. (When you are too straight, you will be forward up and off your sitting bones: when you are slumped you will be behind them, on your tailbone. Note that Figure 14, “Too-straight flutist,” resembles what is commonly called “good posture.” This is in fact a stiff and tense position.)

2) Do this until you feel the point where the rockers are delivering weight straight down into the chair.

3) Find your support throughout the front half of the spine and, without slumping, allow your back and hip muscles to release down toward the chair. You can then have fun moving around on the rockers while playing, like a virtuoso first violinist in a string quartet. Remember to lead with the head and move the torso as a whole, without bending at the waist. (The waist is not the joint for moving the torso.)

4) When you find a fairly comfortable position, play around with leaning slightly forward and slightly back, noticing how your back, front and side muscles respond to the changes in balance. (Note: If you cannot get comfortable on your rockers, sit on a thin pillow.)

Figure 13: Slumped flutist
Teaching tip

Flutists spend much of their playing time sitting, yet often stand in their lessons. To help them learn to sit comfortably, spend at least part of each lesson sitting down and exploring balance. Watch for stiffness in the lower torso as well as movement from the waist only, which indicate lack of balance. Notice also if their legs seem included in their...
awareness. If a student is very uncomfortable, sometimes a small pillow supporting the lumbar spine will help until she is freer. The way you yourself sit and move while sitting can provide an invaluable role model, especially to young players.

Whether standing or sitting, a flutist should have free use of all six leg joints: two hips, two knees and two ankles. Watching rock musicians who move freely may give you some ideas about how to do this.

**Helpful fantasies**

- To get the feeling of the chair really supporting you, imagine that you have six legs - your two and the chair’s four. You will feel quite stable and your legs will be free to move all over, just like an organist playing the pedals.
- Think of the space from the collar bone to the back of the tailbone. Thinking on this diagonal plane will give you a more three-dimensional sensation of your whole torso and help you to feel the weight-bearing core of the spine.

(See Figure 16)
Teaching tips

Students can sit comfortably on the edge, in the middle, or against the back of their chairs if they find balance through the thoracic and lumbar vertebrae and on their rockers. If they are having trouble releasing their back muscles, they can use the back of the chair to support them. Make sure they first scoot all the way to the back of the chair so they are not sitting on their tailbones.

Leaning against the back of the chair does not interfere with breathing if it helps flutists to keep their back muscles free and to find a good balance over the rockers. They can also feel their backs expanding against the chair as they inhale. Good balance is easiest to find in an L-shaped chair. It is harder in a cushioned one or one that slants down in the back. Eventually, flutists can use almost any kind of chair when they learn to find balance.
C. More exercises to help feel the torso as a whole

The balance through the core weight-bearing part of the spine is crucial for gaining comfortable standing and sitting, free breathing, and free arm/hand movement. If the balance is even a little off, the back muscles tighten slightly and impede deep breathing. This also makes it harder to support the flute, as you have to work against your own back muscles to hold it up. We need availability of the lower muscles of the torso to keep the our bodies free and supple for breathing.

- Discover what your habits of breathing are when playing: do you tighten any abdominal, stomach, chest or back muscles to breathe or create support? Practice going between tense and flabby with these muscles, then find a use of them that feels alive, springy and resilient.

- When you pick up your flute, does it feel heavy or light? Considering how little it weighs, it should feel effortless to hold. Excess effort in the arms will make it feel heavier and interfere with balance of the torso. See if you can find the most effortless way to bring the flute into playing position.

**Feeling the whole length of the torso and freeing the back muscles**

*Note: these exercises will be most effective if you can keep your neck free and your spine long.*

- *Sit in the "dugout" (baseball) or "farmer" position: bend at the hips and rest your elbows on your legs near the knee joint. Let your hands dangle (Figure 17). Breathe slowly, noticing how your back frees up and your spine lengthens. If you do not shorten your neck, you can even play a little in this position.*

- *From this position, with your flute in your hands, think of the distance from the hip joints to the top of your head. Then, leading with the head, move your torso in an arc*
from the hip joints (Figure 18). Come to a sitting position without tightening or shortening your back muscles. (You can also move from "dugout" to a standing position.) Pay close attention to what happens as you get part way up - you may find you are tightening your back muscles. Go only as far as you can without tightening, then move back down. Do this several times until you understand how your back muscles are working as you stand and sit. Keep thinking about support from the core as well as free movement and balance from the hip joints, and you will eventually be able to stand without putting pressure on your back muscles.

Figure 17: "Dugout" position
Sitting with your torso draped over your legs, arms hanging to the side, exhale. Allow the spine to lengthen as you exhale. Keep your neck free, and each time you exhale allow the spine to lengthen a little more. If this feels uncomfortable, widen your legs so there is enough room for your belly. Allow your arms to hang on the outside of your legs - this helps your back to widen.

Figure 18: Moving in an arc

Figure 19: Torso draped over legs
• Find the half-way point of a skeleton.\textsuperscript{31} Bend the skeleton at the hip joints and see how the head and feet are equidistant. This is a graphic demonstration of the location of the very middle of the body.

• If you can do it comfortably, squat while playing. Use a wide stance and allow the heels to release into the floor if you can. You will feel the whole torso and you may hear a different sound from what you are used to. Listen to this sound - it has true support from the pelvic floor. In this position it is difficult to tighten the pelvic floor (see Chapter 10 for further information). If you can’t squat easily, try a soccer-size ball or a footstool under your bottom - find whatever is the right height for you. In time you will be free enough to squat.

• Lie on your back with your legs parallel and up on a big ball.\textsuperscript{32} Move your legs slowly and subtly to get the feeling of movement at the hip joints. If you press down lightly with your legs, you may feel your lower back lengthen a little.

Figure 20: Legs up on ball

\textsuperscript{31} See Resources for sources.
\textsuperscript{32} See Resources.
Balancing the arms over the ribs (Figure 21)

A final but very important aspect of balance is the balance of the arm structure over the ribs. In a balanced sitting or standing position, the arm structure will rest evenly on the top of the ribs, with the upper arm bones equidistant from the back and front. Figure 21 shows the collar bones and shoulder blades from the top down. Note that the central place of balance is where the collar bone attaches to the shoulder blade, directly over the arm bone/shoulder blade joint, and equidistant from the vertebrae.

Figure 21: Arm structure balanced over ribs (view from the top)
While flutists’ difficulties with arms and the upper torso are many, most of them can be ameliorated by learning to map the arm structure correctly. If you can get access to a moveable skeleton, it will be very helpful in understanding the arm structure. If not, you can study these pictures and imagine the structure in your own body.

Move your own arm around, and see if you can feel these 4 arm joints:

(See Figure 22)

1) **Sterno-clavicular joint**, or the joint between the sternum (breastbone) and the clavicle (collar bone). This joint always moves when you move your arm - just a little for lower movements such as shaking hands, and quite a lot when you raise your arms high or shrug your shoulders. Try those movements with one arm while feeling the movement of that same collar bone with the other arm. (See also Figure 45.)

2) **Upper arm bone-shoulder blade joint**. Notice the indentation just above the upper arm bone. Feel that spot with your fingers while you move the arm. You should be able to feel the arm bone moving separately from the shoulder blade. The head of the arm bone is attached to a very shallow socket in the shoulder blade, giving the arm its tremendous range of motion.

3) **Elbow joint**. Notice how the “point” of the elbow is part of the longer forearm bone, the ulna.

4) **Wrist**. This joint is a subtle joining of eight little bones, which move in intricate ways.

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33 See Resources for sources.
Figure 22: The four joints of the arm structure

**Finding all your arm joints (puppet play)**

- Move your arms in all different directions, exploring the range of motion and feeling in each of the eight different joints (four on each side).

- Note especially the rotation of the shoulder blade and the movement at the joint of collar bone and sternum (breastbone). These movements are necessary for bringing the flute to playing position.

Now examine the 3 rotations of the arm structure: (Figure 23)
1) **The shoulder blade.** Allowing the shoulder blade to rotate freely over the ribs is essential to finding a comfortable way of holding the flute.

![Diagram of arm structure with labels for shoulder blade rotation, arm bone rotation, and forearm rotation.]

**Figure 23: The three rotations of the arm structure**

2) **The upper arm bone.** You can feel this rotation by dangling your arm and rotating the whole arm. This rotation needs to be fluid to get your hands up from your lap into playing position.

3) **The forearm.** In order to turn over the hand, the two lower arm bones must have a certain relationship: one is stable, the other rotates around it. Before you read any further, explore your own map.
Finding the rotation of the forearm

- Lay your arms palms down on the table straight in front of you, and see if you think the thumb should be in line with the inside of the arm, or if you think the pinky should be in line with the outside of the arm. If you think the pinky lines up with the outside of the arm, you already know how to use this rotation.

- Now put your finger on the point of the elbow - the end of the ulna. Rotate your forearm and notice how the ulna does not move: instead, the radius (the other bone) rotates across it. Mapping this joint correctly is very important: trying to rotate the forearm around the thumb side can cause tendinitis.
Figure 25: The arm rotates around the pinky, not around the thumb

The "shoulder" 34
When flutists tense and pull the arm in at the "shoulder joint," their upper torso muscles are usually tight. This can result from tight necks, tight backs, poor balance or mismapped arm joints. The consequences of pulling in are twofold:

a. There is not enough space for the arm to work properly. This affects all the rotations of the arm as well as the use of the hands and can even lead to tendinitis or carpal tunnel syndrome.

b. Pressure is put on the arms' nerves and blood vessels, which must pass between the collar bone and the top rib. This reduces essential tactile sensitivity and mobility in the hands. 35 (Figure 26)

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34 "Shoulder" is used in quotes. Use of the term shoulder is generally omitted in this paper because the word has different meanings for different people. "Upper arm structure," which includes collar bone, shoulder blade and arm bone, is a more accurate choice. See Figure 22 for a picture of the complete arm structure.

35 This is called "thoracic outlet syndrome" and can often be relieved by correcting the mapping errors and restoring the space that was meant to be there.
With time and attention, these habits of tensing the arm structure can be changed. Here are a few suggestions to help:

**Finding the places where you pull in**

*Do this exercise with a friend:*

- Have your friend hold your right hand with her right hand, with your arm released.
- Then have your friend wiggle your arm gently all around: up, down, front, back and sideways. Your job is to keep it completely free. (Your friend will notice if you are trying to help her move your arm.)
- You might feel a little stretching somewhere in the arm, most often along the back of the upper arm or across the inside of the elbow. This simply indicates the places where muscles are tight due to habitual pulling in at the joints. Notice also how the upper arm bone moves at its joint with the shoulder blade.
- Before your friend wiggles the other arm, you can compare the feeling of both arms. The wiggled one may feel longer - closer to its actual length.

Figure 26: Nerves and blood vessels pass under the collar bone
Helpful fantasy

Imagining that you are “breathing into” a place in the body is a way of increasing circulation to that area and relaxing the muscles. Put your hand on top of an upright piano, extending your arm fully. Allow your arm to hang by its own weight, feeling the places where it is a little tight. “Breathe into” and release these places. This release can be subtle but very effective.

Gaining width in the upper arm structure

Cut two short pieces off of a noodle\textsuperscript{36} and place one in each armpit. Release the muscles around them and all other torso muscles: notice the width that is created.

Since the arm structure is connected to the torso muscles, it is important to understand the basic torso muscles.

\textsuperscript{36} A foam swimming noodle. See Resources.
Figure 27: Front muscles of the upper torso

Notice the muscles that surround the collar bone and the upper arm joint. (Figure 27) If the muscles in this area are tight, pressure is put on nerves and blood vessels, causing reduced sensation and occasionally numbness.
In terms of arm movement, the most important torso muscle attaching to the arm bone is the latissimus dorsi - the wide muscle spiraling around from the lower back to the inside of the upper arm bone (Figure 28). If back muscles are tight, the arm bone will be pulled in, putting pressure on nerves and blood vessels. This can also skew the rotation at the elbow and put pressure across the wrist, paving the way for tendinitis and carpal tunnel syndrome.

**Helpful fantasy**
Think of your shoulder blades open at the back like a hospital gown!
Raising your arms without tightening the torso muscles

- Stand comfortably and well balanced.
- Take a deep relaxed breath and allow one arm to float up to the side on the exhalation. Allow it to go up only as far as is comfortable - maybe only a few inches. As soon as you lose the sense of free movement, stop there.
- Inhale again, and on the next exhalation allow the arm to float up a little more. Keep your arm long, feeling the width of your upper arm structure and the connection to your back. (Watch to see if you are allowing the arm to move freely at its joint with the shoulder blade, or if you are trying to move it from another place such as the middle of the collar bone. See Figures 29 & 30.)
- Repeat the above step until it is no longer comfortable, then with a sigh allow the arm to drop. (If you are already free it will be easy to raise your arm all the way up to your head.)
- You can repeat the whole exercise or go to the other arm. Each arm may go different distances if you have differing amounts of freedom on each side.
- If you do this a few times during your practicing, you will soon begin to have more mobility. Eventually you will be able to raise your arms to the sky without tightening your upper torso. (Hint: use a mirror to see that you are moving the arm freely at the joint, as in Figure 29.)
Now transfer this free arm movement to the flute.

Bringing flute to playing position with support from back muscles (Figures 31 & 32)

- With your flute in your right hand, hold your left arm straight out in front of your body. Keep it there until you begin to feel it connected to your back muscles (remember the latissimus dorsi muscle goes around the sides, from the sacrum at one end to the upper arm bone at the other).
- Then bend your arm at the elbow and place the flute in left hand playing position. (At this point you may want to rest your flute on your left shoulder.)
- Take your right arm and reach it straight out to the side. When you begin to feel the connection to the back muscles, bend it and put your fingers on the flute.
- Keep your arms feeling long and your upper arm structure wide. This should give you a good playing position for your arms. You can experiment with the angle of the flute to the torso by turning the head and neck slightly and moving the right arm forward. (Note that the rest of the spine will respond to the head turning.) For many people a 45-degree flute/tORSO angle is comfortable, but if you’re pregnant, have short arms or need more room in the front, you can bring the right arm forward more. This movement is crucial for comfortable support of the flute. Any angle between 30 and 60 degrees should be workable if your arms are free.
• *Remember that the free-floating rotation of the shoulder blade over the rib cage is part of this movement.*

![Figure 31: Left arm out in front](image1)

![Figure 32: Right arm out to side](image2)

**Teaching tips**

- To find a good playing position, put your fingers on the keys and bring the flute above the head, arms stretched up, without arching the lower back. Slowly lower it into position, keeping the arms long and the upper torso wide.

- To make sure the left shoulder blade is rotating enough, reach the flute too far to the right and then ease it back into playing position. Notice how that creates more width in the upper arm structure.
Marching band tip

Playing with the flute pulled back, parallel to the ground, can cause much discomfort among young flutists. If your students are required to do this, you might offer a class on marching band movement. By showing them the rotations of the shoulder blades and arms as well as good balance in standing, you can help them to reduce the discomfort. Make sure they do not pull the right shoulder blade back as they bring up the flute. Also encourage them to remain free and flexible inside both while marching or holding a position. If they learn good balance, they can exhibit great “posture” without having to stand military-style with the chest out, shoulders pulled back, and lower back arched.
As teachers, we spend a lot of time trying to correct hand position. While some problems can be solved by repositioning fingers, many are caused by the mis-mapping of arm/hand joints and muscles as well as the related torso/spinal muscles and core support, which can interfere with the balance of the arm structure over the torso (see Figure 21). When this is the case, it is important to try and discover the root cause of the hand problem. Observe the balance of the student’s head and neck, whether the arm structure is balanced over the torso, and whether standing and sitting look balanced.

Sometimes, hand problems are caused by mis-mapping of the hand itself. Here are some common mapping issues.

**Joints of the hand**

Look at the picture of the hand bones, and then at the picture of the whole hand (Figures 33 & 34). Notice that the edge of the palm at the bottom of your fingers does not correspond with the joints, which are actually in the palm. Try moving the fingers as if the joints were at the bottom of your fingers. You will probably not be able to move your fingers very well. Now try moving the fingers from the actual joints, and see how much easier it can be.

Notice also that the bones of the hand go all the way to the wrist. Try moving your fingers again, this time feeling the connection to the wrist bones. That should give you more flexibility and freedom.
Eight wrist bones

Figure 33: Arm, wrist and hand bones

Top edge of palm

Joint of fingers

Figure 34: Whole hand
The wrist

If you find you do not have a clear idea of how the wrist is structured, look carefully at the above picture of the hand bones (Figure 33). The wrist is made of eight small bones that glide in very complex ways, giving us tremendous flexibility and range of motion. Unfortunately, in flute-playing we often shorten across the wrist, compressing the bones together to reduce circulation and pinch nerves. Spend a little time exploring the range of motion and flexibility of your wrists, then bring that to the flute. Keep thinking how long the wrist is and how free it can be while you’re playing. This can result in increased flexibility and speed of finger movement.

A good understanding of hand mapping - i.e., structure, function and size - can help eliminate pain and improve technique. Fingers will move at optimal speed only if there is no pressure on their nerves and blood vessels or limitations at their joints.

Making the right hand wide enough to reach low B (Figure 34 & 35)

If you need to have a little more space between your fingers to reach low B, widen all the way to the wrist through the bones in the palm of the hand, instead of from above the palm. You will also get more stability if you think of the right hand as a U-shape, from the thumb around to the pinky.
Use of the thumb (Figure 36)

Remembering that the first joint of the thumb is also back at the wrist is very important for supporting the flute in both hands. Try supporting your flute just from the second joint of the thumb, at the big knuckle. Now use support from the whole thumb, feeling the connection through the wrist and the arm to the back. This should make holding the flute easier.
Hand position

The best hand position on the flute is the one that is closest to the performer’s natural hand shape and size - therefore this may vary from person to person. Here are a few ways to find that individual shape.

Good left hand position

• **Put fingers on the correct keys. Then take your left arm to the side and hold the flute like a shopping bag, full of a nice soft sweater from your favorite store. Allow your arm to hang, feeling your fingers securely on the keys, and move the hand a little at the wrist.**

• **Now get your right hand ready in playing position, and swing the flute up to catch it on the right thumb. Look at your left hand. The fingers and wrist should now be in a position that is comfortable for you.**

• **Notice that if you have correctly mapped the rotation of the forearm bones, the pinky should have no trouble reaching the G# key and the thumb should slide easily from the Bb to B thumb keys.**

![Figure 37: Shopping bag hold](image)

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37 If you have a student whose left index finger is almost as long as her middle finger, a piece of foam (placed where the index finger supports the flute) may help her get a more comfortable position. Tubular foam pencil grips can be slit open and used for this purpose.
Good right hand position

Pick up a pencil with thumb and fingers opposite each other to find your natural right hand position. Remember the thumb goes all the way to the wrist bones. Then, leading with the pinky and the ulna side (outside) of the arm, place your right hand on the flute. Keep the same balance in the left hand that you had from the previous exercise.

To see if you have complete sensation in both hands

Rub thumbs against fingertips in both hands: see if they are equally sensitive. If you have pressure on the nerves on either side of the upper torso, you will feel less sensation in that hand.

To understand the connection between upper arm structure and hands

Standing or sitting in a good wide-open and balanced position, rub fingertips as above. Then shorten the back of the neck slightly and allow the arm structure to curve in, crunching down a little. Now rub fingers again and see if the sensation is reduced. For most people there is a recognizable difference. Notice also how your arms shorten across the elbow and wrist when you cave in, making it harder to get the length and flexibility needed for good hand position.

Teaching tips

a. Helping students to find their best hand position involves:
   - checking for good core support along the spine. This support frees the back muscles, which can then do their job in helping to move the arms all the way from pinky to shoulder blades, like wings.
   - looking for balance of the arm structure over the ribs
   - making sure they understand the arm rotations correctly
   - correcting mapping of arm and hand joints
   - finding a comfortable similar hand position without holding the flute.  cont. next page
b. The balance between hands can change depending on which hand is getting more work in a given passage. The hand with less work can be used to support the flute more, giving the active hand more freedom to move.

c. Once you get good balanced hand and arm use, then you can experiment with changing head joint rotation and position (such as modified Rockstro position).[^1]

d. If a child’s arms are short, she can find more comfort by turning her head to the left and moving the right arm forward a little more.

[^1]: This position is advocated by many teachers. See Walfrid Kujala’s *The Flutist’s Progress*. Winnetka, IL: Progress Press, 1970, p.90-91.
CHAPTER 9

HEAD AND NECK

The head and neck are small compared to the rest of the body, but the mapping issues they contain for flute players are huge. Because most of us tense just a little in the neck while playing, we must pay particular attention to these areas. Even that small amount of effort used to play pianissimo, for example, may result in neck tension, limiting both our flexibility in getting the note as well as the tone produced. Remembering the laws of the spine (see Chapter 3), we must also realize that the rest of the spine will tense proportionally and we will be compromising hand/arm movement and leg support.
The whole embouchure

Many people think that their lips are only the red part that you put lipstick on. If you look at Figure 38 you can see that there is a muscle that goes around the mouth, creating the whole lips, like clown lips. Use of all this musculature is extremely important in finding a flexible and refined embouchure.\(^\text{39}\)

Teaching tip

Whether students are beginning or more advanced, they can benefit from exploring all the face muscles. Have them look at Figure 38 and try to make faces using each group of muscles they see. Some examples are: pout, sneer, sniff like a rabbit, stretch out the upper lip like a horse, squint, etc. Emphasize that all these muscles are available to fine-tune the embouchure and make subtle differences in tone color and dynamics.

Tonguing

Look at Figure 39 to see if it agrees with your idea of the location and size of the tongue. Many people think it is smaller, or attached in a different place. The tongue is not one muscle, but a group of muscles which move in a very complex and sophisticated way. A free neck is essential for free tonguing. You can practice double tonguing for hours, but if your tongue is bunched due to neck tension, your tonguing will never get very fast.

Figure 39: The tongue
Teaching tip

Begin teaching tonguing with the syllable a student uses in her native language. A Spanish or Russian “tah,” for example, is produced differently from an American “tah.” It is easier for the student to learn tonguing with the tongue placement most natural to her. Then you can explore other tongue placements as a way of varying articulation.

The jaw (Figure 40)

The jaw is the source of much confusion and pain for many flutists. Two things are important to understand:

1) the jaw is one bone, not two. People who think there are two jaw bones - an upper one and a lower one - often work too hard and do a lot of extra head-moving.

2) movement at the joint of the jaw and the skull - the temporomandibular joint (TMJ) - is severely compromised by a tight neck. Look in Figure 40 to see what part of the jaw bone attaches to the skull. Normally the jaw opens just by releasing down. If the back of the head is pulled back and down, as in a typical pattern of tension, the jaw is pushed forward and up so that opening it requires effort. Use of the jaw in this manner can trigger TMJ problems.40 When students learn to take the pressure off the jaw joint by freeing the neck and balancing the head correctly, TMJ symptoms often lessen.

40 Students who have symptoms of TMJ syndrome should see an expert in this area.

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Finding the joint of the jaw and skull (the temporomandibular joint)

While gently opening and closing your jaw, slowly move your fingers up and down the side of your face just in front of your ears. Find the place where there is no bone movement (above the joint), where there is a lot of movement (below the joint, on the jaw) and the place where you can feel the tip of the jaw as well as the skull (right at the joint.)

Teaching tip

Students should explore jaw movement - out, in, up and down - to see if they have free range of motion at the jaw joint. Very subtle movements of the jaw are useful for control of intonation, dynamics and articulation.
Often jaw tension is accompanied by tension in the front neck muscles. When the throat tightens also, especially around the larynx, this presents serious tone and flexibility problems for flutists. One manifestation of this problem is when a flutist "sets" the head and neck in a certain position before playing, often thrusting the head forward out of balance. Usually this introduces tension into playing even before any sound is produced. Such a habit was probably learned so long ago that the student is rarely aware of it.

**Teaching tip**

Watch a student from the side as he prepares to play, and notice what happens between the time he raises his flute and the time he makes a sound. You will often see a slight tensing at the back of the neck or a setting of the jaw. Ask the student what he notices. Then ask him to simply breathe and blow, without any preparation. Usually this produces a freer sound. It also helps the student to have more choices about the way he begins a note or phrase.

**Helpful Fantasies**

Imagine you have lots of jowls hanging down in the front of the neck, like an old lady or Richard Nixon or a turkey. Let the neck muscles feel as if they're drooping down.

While you're going to sleep at night, check your jaw and neck muscles to see if they're loose. Have the feeling that you're drooling.
Players often find they need less embouchure and jaw work as they include more of their body in support and tone production. As the neck frees, the face and jaw muscles become freer and more flexible. Increased flexibility in the head and neck makes embouchure movement easier and less adjustment necessary for register changes. Increased use of the whole body for support creates more depth of tone and lessens the necessity of using the embouchure and oral cavity alone for tone color. It also becomes easier to use the sinus cavities of the head for resonance.41

**Helpful fantasy**

While doing long-tone exercises, imagine creating the sound from different parts of your head, or from the back of your neck, or from the chest or knees. You may notice subtle variations in tone color that can be created without adjusting the embouchure.

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CHAPTER 10

BREATHING

The physical processes of breathing have been the subject of extensive discussion for many years. The principles of Body Mapping can make a significant contribution to this discussion by showing the structures and functions of the physical processes of breathing. If you find your students have misconceptions, you can use this information to help them correct their mapping and gain more freedom, capacity and support.42

A. Apparatus (Structures)

The structures that do the work of breathing are very simple:

- the diaphragm does about 75% of the muscular work;
- the intercostal muscles (muscles between the ribs) do about 25% of the work;43
- the lungs hold the air;
- the abdominal wall (360°around the body) and pelvic floor work synergistically with the diaphragm;44
- the spine supports the breathing structures and lengthens and gathers reflexively.

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43 Other small muscles, which help with rib movement, will not be discussed here.
44 Very little is written in the pedagogical literature about the activity of the pelvic floor in breathing. While it is used by many people, its proper description has escaped notice until recently. The author believes the pelvic floor and abdominal wall work together, but has no research proving it. More research needs to be done on the part it plays in deep breathing.
1. The Diaphragm

The diaphragm, large, thin dome-shaped and very strong, separates the chest (thoracic) cavity from the abdominal cavity. In the front it attaches to the ribs and sternum, and in back it attaches to the spine. It domes up over the digestive organs, and the heart nestles on top of it next to the spine.

Figure 41: The thoracic and abdominal cavities

Figure 42: The diaphragm from the front
There are a few important mapping issues here.

a) The diaphragm has no sensory nerve endings, so you cannot feel it directly. You can feel the movement of the muscles and viscera around it.
b) The diaphragm is connected to the spine: how you use your spine for support thus has a direct effect on breathing.
c) It is also associated, through some continuous muscle fibers, with the long internal pelvic muscle, psoas major, which attaches to the inside of the thigh bone (femur). (See Figure 43.) As a result, your use of your legs can impede or enhance your breathing. When legs are tight, breathing is limited. When legs are free and flexible, more air and support are available because the diaphragm is freer to move.
d) The diaphragm is higher in the body than many people imagine. (See Figure 50.)

Many of us unconsciously tighten our legs while playing. Watch your students to evaluate their use of their legs: are they free and flexible, moving at all six leg joints, or rigid and tight?

![Image of the diaphragm, iliacus, psoas and iliopsoas muscles]

Figure 43: The diaphragm, iliacus, psoas and iliopsoas muscles
How the legs help with breathing

- Sit comfortably in a chair and tighten your legs and gluteal muscles. Now breathe and play. Notice how your breathing feels.
- Now release the legs and gluteals, feeling your weight supported by the chair and the floor, and breathe again. You should be able to get more air.

The diaphragm has two lobes, following the shape of lungs and the ribs. Notice in Figure 44 how the diaphragm curves around the front half of the spine. Breathing therefore involves the back of the torso as well as the front. Try breathing using only the front half of your body - then add the whole torso. You should be able to get more air.

![Diagram of the diaphragm from above](image)

**Figure 44: The diaphragm from above**
2. The lungs

While the bottom of the lungs do not descend as low as the bottom ribs, the top lobes of the lungs are actually slightly higher than the collar bone. Look closely at the tips of the lungs in Figure 45. Now imagine this on your own body and take a full breath. You might find you get more air when you think of including that part of your lungs as well. Think of the lungs up high, like the oxygen tanks of divers.

B. The Movement of Breathing

While the diaphragm does the primary work of inhalation, and the abdominal wall (360° around the body) and pelvic floor are most active in exhalation, there is movement throughout the whole body in response to this work.

Let's look at the movement, starting at the top.
1. Pharynx (Figure 46)

The pharynx consists of the passageways inside your head and upper neck where you breathe, speak and swallow. The muscles of these passages should stay completely free in breathing, allowing the pharynx to remain open and flexible. If a student makes noise on inhalation or exhalation, he probably has an idea that those muscles should work during breathing. You can help him to breathe quietly by explaining about the pharynx and reminding him, every time he takes a breath, that he does not need to work these muscles to breathe. (If he makes vocal sounds while playing, he may think those muscles or the larynx need to work to produce tone or dynamics.)

![Figure 46: The pharynx](image)

**Nasal pharynx**

**Oral pharynx**

**Laryngeal pharynx**

*To find the muscles of the pharynx*

Swallow. The muscles you use in swallowing are those of the pharynx. Notice that they start behind the nose and go low into the throat.
Many teachers have used the description of "warm air" and "cool air" to distinguish the movement of pharynx muscles in inhalation. "Warm air" occurs when the pharynx is open and free. "Cool air" occurs when the pharynx is constricted and the air coming in does not have time to be warmed by the body.

Imagine breathing in from the back of the neck. This helps include keep neck the muscles free and the pharynx open.

2. Ribs

There are twelve sets of ribs. Ten sets are attached in front to the sternum by flexible cartilage (see Figure 45). All twelve sets have a joint with the spine on each side, making twenty-four rib joints along the back (Figure 47). Try breathing and allowing all of these joints to move.
All the ribs move up and out on inhalation, down and in on exhalation. Because most are attached at both ends, the movement is rather like the handle of a bucket. Touch the ends of your thumbs together and the ends of your index fingers together, and move them up and down. This is a good way to show students the movement of the ribs.
To feel your rib movement

- *Put your thumbs under your arms, with fingers touching in front over the sternum, so you can feel your hands against the ribs.*

- *Take a full breath, allowing the ribs to move fully up and out. Notice how your fingers separate slightly.*

- *Exhale, allowing your hands to move down and in with the ribs. Keep exhaling as long as you can to find the full range of motion of the ribs. They can go down and in quite far.*

- *When you’re completely out of air, inhale again, quickly, and you’ll feel quite a lot of rib movement. You might even feel the top rib do a slight extra lift at the peak of your inhalation.*

- *Now take this to the flute and do some long tones. See how much rib movement you can find.*

Remember, the chest must move while breathing. If you don’t see rib movement in a student, he is seriously limiting his capacity.

**DESTRUCTIVE FANTASY**

Many students have been told not to move their chests when breathing. If you really hold your chest still, it is impossible to breathe at all freely. If a student is heaving the chest up and down, she probably doesn’t understand about core support, movement of the ribs and the expansion of the lower torso. Instead of allowing her chest to expand naturally, she is moving the spine up and down in a misguided effort to take in air.
3. Lungs

The movement of the lungs depends on how much air is being inhaled or exhaled. The lungs move with the ribs, though at the bottom they never descend lower than the ribs. In shallow breathing there is a natural elastic recoil of ribs and lungs during exhalation. Figure 50b shows the changing shape of the lungs.

![Figure 50: The movement of breathing (schematic drawing)](image)

4. Under the Dome

Below the diaphragm there is a tremendous amount of movement, as evidenced by the expansion of the abdomen. The abdominal wall has a free-flowing synergistic relationship with the diaphragm. When the diaphragm contracts down, the viscera push the abdominal wall outward in all directions. As the diaphragm releases up in exhalation, the abdominal wall contracts inward.

The use of this word “contract” has been the subject of some controversy. Contraction in the anatomical sense means shortening muscle fibers, though not necessarily with tension. For example, contracting the biceps to bend the elbow can be a movement of tension or an easy, free and fluid movement. Although “contraction” is the
correct anatomical term for the action of the abdominal muscles, it may imply considerable effort to some people, causing them to tighten the abdominal wall by either pushing out or in. Every flutist should know that tightening the abdominal wall is destructive to free breathing.

In shallow breathing, the abdominal wall does very little work. In deep breathing for a long slow exhalation, as in playing the flute, there is more work involved. On inhalation, the abdomen expands dramatically and the pelvic floor is pushed down. On exhalation, the pelvic floor rises slowly while the spine lengthens slowly; simultaneously the abdominal muscles come back in slowly. When this synergistic balance is achieved the effect is not of work, but fluid and continuous movement. While it is a combination of reflexive movement (the beginning of each exhalation and inhalation) and controlled movement (the slow ascent of the pelvic floor and diaphragm and the return of the abdominal wall), it feels more reflexive than controlled.

Before going any further, it is important to discover how to free the abdominal wall. If it is not flexible and easily moved, the balance described above will not be achieved. If you have a student who was taught to support by tensing the abdominal wall, this is especially important.

Learning to release the abdominal muscles
- Free your mind from worries and lie on your back in “constructive rest position” (see Resources). Find the easiest way of breathing. Allow your body to feel totally supported by the floor.
- As you become more relaxed, notice how your abdominal muscles move naturally and your back feels more in contact with the floor. You may also find yourself able to move your ribs more easily (especially at their joints with the spine), as well as to feel air filling the upper lobes of the lungs.
- Now try to recreate the kind of breathing you habitually use when playing flute. If it creates tension in the chest, abdomen or back, see if you can go back and forth.
between the two kinds of breathing until you really understand the difference and can begin to make a choice.

- Then try the same thing standing up. When you take your first truly relaxed and free deep breath, there will be a release all the way through the hips and into the legs. Then you will be able to experience movement from the pelvic floor. (If abdomen and back muscles are tense, this movement is difficult to find.)

Once you understand how the abdominal muscles can move freely, then you can engage the whole torso in the process of breathing. If you watch a dog or a baby while sleeping, you'll see that there is very subtle but free movement throughout the whole torso, including the hips.

To feel the movement of the whole torso while breathing.
Drape over a ball (see Resources), breathe deeply, and feel the movement of your body against the ball as well as throughout your back and hips. A medium-sized ball works best for this.
To find lower torso muscle movement

Play any easy note, say a middle G, in short, even spurts starting with air only from the cheek cavities. As you continue to play, allow lower muscles in your body to move the air every few notes, until you find the lowest point for the movement (i.e. first from the throat, then chest, then abdomen, etc.). When you reach the bottom, hold the note and see if you can allow the nasal cavities to open up. You will then have a new kind of resonance: you will be producing a beautiful full sound with your whole body.

5. Gluteal Muscles

Notice in Figure 52 how the gluteal (buttock) muscles spiral out and down. They attach to the top of the leg bone, thereby providing the largest connection between the pelvis and the legs. These muscles are crucial for free breathing. If they are tight from imbalance or mismapping, they will restrict abdominal and pelvic floor movement, limit your breath capacity and keep you from experiencing your fullest support. They will also initiate a pattern of tension in the leg and foot which torques the leg outward, bunches the thigh muscles, and angles the foot out. If a student has had these muscles chronically tight for years, it may take some time to free them.
Helpful fantasies

Learning to release the gluteal (fanny) muscles
Think of them drooping to the floor.*
Remember Balu in Disney’s “The Jungle Book” animation? He had a rear end that was completely free.
Shake your booty!
Feel like you’re wearing wet, heavy diapers.*
Think of your hips as wide and low.*
Let your heels sink into the floor (keeping your weight balanced through the core and the arch of the foot).
Imagine there is more space in the leg just above the knees.
*Remember to keep a feeling of buoyancy and uprightness while doing this.
Helpful fantasy

While inhaling, think of movement into the gluteal muscles very low and wide. This creates a lot of space for the internal organs and diaphragm to move down.

On exhalation, think of the gluteal muscles going down. This also gives the most space for the lungs and innards. At first it takes some time to coordinate. Practice while going to sleep at night, driving or riding the bus - it can be very relaxing.

6. Pelvic Floor

The movement of the pelvic floor is one of the best kept secrets of breathing, and has been largely left out of pedagogical materials. Here's how it works:

- As the diaphragm contracts down to draw air into the lungs, it pushes the viscera down.
- The muscles of the pelvic floor, which are very springy and elastic when free, move down in response to the viscera. (There is a corresponding expansion of the abdominal wall and the back. Since the movement of back and pelvic floor muscles are limited by bone, the most visible expansion is in the front abdominal wall.)
Figure 53: Movement of diaphragm and pelvic floor (schematic drawing)

Many students will need to become acquainted with their pelvic floor muscles in relation to playing. The musculature of male and female are quite similar: the major difference is that the male pelvis is smaller and deeper than that of the female.

Figure 54: Pelvic floor muscles
Finding the pelvic floor muscles

- Cough. Notice what moves. Cough again, a strong cough, and notice again what moves. You’ll probably notice movement all the way into the legs (more proof that legs are important to breathing). You will also feel the pelvic floor muscles move down.
- Yell. Give a few good deep yells - HUH - and feel what moves. That’s the pelvic floor.
- Tighten the pelvic floor muscles, as if you need to go to the bathroom but have to hold it. Then release them. Experiment with this until you can really feel those muscles move.
- Do Kegel exercises.\(^4^5\)

To experience a resilient pelvic floor while playing

Play harmonics from a low note, but do not use the embouchure to get the high notes. Create the harmonics solely by feeling the responsive movement from the pelvic floor while increasing the air speed. (This may be hard if you’ve always done harmonics with the embouchure.) When you have the highest harmonic, notice how the pelvic floor feels.

Learning to use the pelvic floor in breathing is, along with the lengthening and gathering of the spine, the final key to finding breathing that is free, responsive to the music, and with the capacity and support that you want.

7. Spine

The other well-kept secret about breathing is how the spine moves. Take a moment to breathe slowly, and ask yourself whether you think the spine should gather or lengthen during exhalation. Although many flutists sink slightly on exhalation, the natural movement of a free spine is to lengthen slightly during exhalation. This makes it possible

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\(^{45}\) These exercises are used by women to strengthen pelvic floor muscles. Do them by stopping and starting the stream of urine when going to the bathroom.
for the ribs to come in and down without the torso collapsing. Instead, you are buoyant and upright, ready for the next inhalation.

*To feel the lengthening and gathering of the spine*

- Lie on your right side with your head on your left hand. Breathe deeply, releasing your back and abdominal muscles, and feel the movement of your head on your hand. Try also lying on your left side.

![Figure 55: Lying on the floor](image)

- Drape over a ball or drape your torso over your own legs (see Figure 19 or 20), and notice the movement of your head as you exhale.

- Lie face down on a bed pillow or two on the floor (Figure 56). Relax and breathe freely, and you'll feel your head moving back and forward on the floor. (If you have a thick rug, put a glossy magazine under your forehead).

![Figure 56: Lying on a pillow](image)
8. Review of the movement of breathing

**Inhale:** The ribs move up and out; the diaphragm contracts down; the abdomen, sides and back move out; the pelvic floor descends; and the spine gathers slightly. This is the movement of inspiration.

**Exhale:** The ribs move down and in, the diaphragm releases up, the entire abdominal wall (front, sides and back) contracts in, the pelvic floor rises, and the spine lengthens slightly. This is the movement of expiration.

Can you imagine these movements in your body? Try them. Do it without your instrument for a while until you feel coordinated.

C. Support for Breathing

"Push down."
"Push your belly out."
"Feel as if you’re going to the bathroom."
"Stand up straight."
"Grunt."
"Create resistance in your abdomen."

While these well-intentioned but misguided exhortations and many more have been used to convey some ideas of support, they fall far short of describing the whole process. It will be useful here to define support, using all we’ve learned so far about balance and breathing.

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46 Remember, this movement is a reflexive shortening, not a tightening of muscle fibers.
Support is the process and the structures which aid or back up our breathing. It makes breathing easier, gives vibrancy to the tone, and helps us get the kind of long exhalations which are necessary for flute-playing.

Physically, it is:

- the core support of the spine, which puts weight-bearing in the middle of the body and takes pressure off back muscles, which then become free to be used in breathing.
- the resiliency of the abdominal wall all around the body,
- the resiliency of the pelvic floor, which provides a smooth and fluid exhalation,
- the lengthening of the spine, which is aided by release of the long internal pelvic muscles,
- the legs and feet, which provide support from the floor, and when engaged in breathing give the “bottom” we need to enliven the air.

In short, support for breathing is the use of the whole body, with particular engagement of the pelvic floor and the lengthening/gathering of the spine. The muscle quality is one of resilience and springiness, not tension. The structural core support aids free movement, as well as all the muscles which help in free breathing.

To discover this kind of free breathing with core support, you must:

- find balance at the feet,
- free the knees and hips,
- free the gluteal muscles,
- free the muscles in the abdomen.

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47 Many method books describe the abdominal wall as the main source of support. This is true only if the pelvic floor and the lengthening of the spine are not engaged in breathing. Once these dynamics are incorporated however, the feeling of support seems to be from below, through the pelvis and the legs.
When you get this kind of support from below you don't need to tighten the abdominals. Conversely, if the abdominals are tense, the resiliency of the pelvic floor will be lessened.

**Helpful fantasy**

The feeling of support can be like a fountain:

while the spine is lengthening,
the outside muscles of the body are draping down.

**How to develop longer exhalations**

When you can feel the resiliency of the pelvic floor and the lengthening and gathering of the spine, try some long tones. As you exhale, allow the pelvic floor muscles to come up slowly. This will make your phrase longer; you will feel the lengthening of the spine also helps extend the phrase. The lengthening begins slowly, but as the exhalation progresses, the lengthening moves faster, ending with a slight release of the head at the A.O. joint. This drops the chin slightly, putting it in the perfect position for ending a phrase and beginning the next inhalation.  

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48 If a student sinks on exhalation, the chin will probably push slightly forward and up at the end of a breath, causing the student to tighten the neck and to gasp for air.
Helpful fantasy

How to eliminate tension in breathing

In spite of our intentions to breathe freely and easily, we often create tension by trying too hard, expending too much effort, or wanting something too desperately. Imagine being tense, and see how the tension affects your breathing. Then, "exhale into" where the tension is and release the muscles that have been over-working.

Teaching tip

Help students to be expressive by having them try different ways of breathing according to the mood of the music they’re playing. Ask them to speak dramatically, as in an argument or in a play. For example, when they’re interrupting someone with "But...": how do they breathe just before they say "But..."? How do they breathe before a sigh? Their everyday speech is all the practice they need for expressive breathing.

Finding out how much work it takes to breathe

As you’re sitting, just let the pressure off your chest: the air will come in all by itself!
Teaching Tips

Teaching phrasing through breathing can be fun.

• Take a breath according to the expression you want.
• Think of the whole phrase at once. When you think of where the music is going, your body will automatically adjust the amount of exhalation to reach the end of the phrase. The breath and music go together.
• You don't always need full lungs for each phrase. Try this: Exhale so your lungs are about half full. Take a full breath. Then exhale completely, allowing the ribs to come all the way in and down, and inhale again. Which inhalation is easier? For many people it is the second one, which is more reflexive. Practice your breathing by taking only the amount of air you need to complete a given phrase: you may find the whole process feels much more organic.

D. Summary

• There is significant movement in the chest and back during free and complete breathing.
• There are twenty-four joints where the ribs meet the spine. All of these joints move during breathing.
• The spine lengthens on exhalation and gathers on inhalation, allowing the body to widen and deepen in all directions.
• The movement for breathing is felt in the whole of the body, not just the torso.
• The tops of the lungs are located just above the collar bone.
• The lungs curve around the front of the weight-bearing spine and down over the back of the diaphragm, creating a deeper dimension for breathing in back that increases capacity.
• Abdominal muscles (the abdominal wall) are around the whole torso, not just in front.
• The back of the diaphragm is connected to the spine and to the legs through the long internal lower torso muscles - psoas major and iliopsoas - which lie along the side of the spine and pass in front of the pelvis, attaching to the inside of the upper leg bone (femur).
• The diaphragm is largely involuntary so it is necessary to get out of its way by freeing the abdominal wall and pelvic floor.
• Since the diaphragm has no sensory nerve endings, you don’t actually feel it move. What you feel instead is the movement of the muscles and organs around it.
• The best support for breathing comes from free abdominal muscles, a resilient pelvic floor and the long internal lower-torso muscles (psoas major and iliopsoas), which can aid in the lengthening and gathering of the spine.

When your students fully incorporate this information and good standing/sitting balance into their understanding of breathing, they will experience freer movement, better support and increased capacity. They will also begin to understand that breathing is a natural process and does not need to feel like hard work.
CHAPTER 11

CONCLUSION: HOW TO INTEGRATE THIS WORK INTO YOUR TEACHING AND PLAYING

The use of Body Mapping in teaching offers a more global approach to working with students. Looking at the use of the whole body to solve a hand problem, for instance, becomes a powerful way of giving your students not only information which they can use to help themselves and their future students, but also a way for you to see how problems are related. The same tense neck that is causing a hand problem can be creating difficulty in breathing. By working with a student to improve the use of his whole body, you can help him improve the use of related parts.

Helping students with their maps

As teachers begin to understand this work, they often wonder how they will know what their students’ body maps are. Becoming a skilled observer of students’ body maps is a process that develops gradually over time. You will need to learn the mapping information on your own body first. Soon you will find yourself thinking: “he doesn’t seem to know where his arm joints are,” or “she needs to learn about the dynamics of the spine,” or “he doesn’t notice his feet.”

Notice your students’ habits. Are these habits enhancing or detracting from their playing? If you have tried to help change a certain habit but had no success, consider that

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49 You may need to explore other resources before you feel sure of your own body map. The basic information is relatively easy to understand, but the ongoing refinement of your own body map is a lifelong learning process.
there may be a mapping issue. For example, a student who cannot find a relaxed embouchure may have no idea that she can use all the muscles around her mouth. If she thinks that the lips stop at the red line, she will not be able to access use of the "clown lips." Taking a few minutes to show her pictures of the face muscles and explore lip movements may be all you need to help change that habit. (See Figure 38)

Ask lots of questions inquiring into your students’ thinking about their maps. Give them time to formulate their responses, especially if they do not have a highly developed kinesthetic sense. You may be surprised by some of the answers you get! Also, as they play, ask yourself what you would have to think to move the way they do. Often this will provide an insight into their thinking.

Be attentive to your language. Use words like “comfortable” and “freedom” and “balance” instead of speaking about “position” and “posture” - words which often imply stiffness to people. Coaching them while they are playing can help improve their awareness of their own body. Phrases such as “sit comfortably,” “take a full breath,” “keep your head and neck easy,” “soft hands,” “include your feet,” “unlock your knees,” etc., will remind them to be inclusive of their whole selves. If you have permission to touch them, placing a hand occasionally on their back for a few seconds will help remind them to include the back in their breathing.

Be especially supportive of their changes. The old teaching style of telling students everything they do wrong can be conducive to creating tension. Supportive, encouraging language helps students become freer. By naming the positive changes they make you can also help them to build on their own work.

Keep reminding them that they have choices in how they move and in how they use their attention. Often they get so caught up in the music that they forget to pay attention to themselves. Ask them what parts of their body they left out when they played that last phrase, then have them play it again and include those parts.
Have lots of visual aids around your studio. A good anatomy book, charts, and a small moveable skeleton can be used to explain most mapping issues. Videos of wonderful natural flutists can provide models of free and fluid playing.

You can also use mirrors and videos of your students to help them see their deleterious habits, as well as what they do well. Placing mirrors on opposite walls of a room gives a student the chance to see her back. She can tell if it is shortening and narrowing or lengthening and widening while she is playing.

When you get frustrated and cannot find a solution to a problem, take a symptom and trace it back as far as you can. For example, one student is having trouble with her right hand pinky finger. Examine how it relates to the hand and wrist, to the arm structure, to the neck and head balance, and to the whole body. You may find things which affect it that are nowhere near the hand! Keep looking for these connections among different parts of your own body - you will find that the more you know the more connections you will make.

**Helping with practicing**

To help students incorporate this awareness into their daily practice, it is better in the beginning for them to work for short periods of time - five minutes or so. This work will require more of their brain than they are used to using, so at first it may feel tiring.

Mental practice is a wonderful way to work through many issues. It is the process of imagining everything about playing, from the sound you want to feeling the movement of the fingers, without actually moving or playing your instrument. By being less focused on your instrument and more conscious of your body, you can often notice habits sooner and establish new ones more easily.

Keep your students moving. One of the things that most often gets in the way of fluid playing is that we simply stop moving, especially inside. If you have a student who can not remain free inside while standing, have him walk around while playing. Quite

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50 See Resources for suggestions.
often this will make it easier to stay out of the old habits. Without stopping the music he can sit down, stand up, bend over, walk backwards, squat, etc. Any amount of rigidity is the enemy of free playing.

Help your students to become more process-oriented than goal-oriented. The trickiest thing about this work is that if you are too goal-oriented or if you want results too much, you can narrow your attention and lose freedom. If you say “OK, today I have to learn how to balance my head and neck,” you may not learn a thing. If you think “Well, I wonder how my neck is moving today…,” you may learn a lot more. The goal of one practice session might be to be as free as possible - not thinking about notes or expression or anything but just how free you can feel. At another session the goal could be to be aware of your feet, or to notice how you breathe. Anything that brings more of the self to playing will improve playing.

On the other hand, don’t be afraid of frustration. Sometimes we learn the most when we are so frustrated with our inability to get what we want that we are willing to try anything, go back to the beginning, or look at the problem from a completely different angle.

Lastly, keep going back to the principles of Body Mapping:

Remember the laws of the spine.

The body map governs our movement.

Consider every part of the body in relation to the whole body.

The quality of movement determines the quality of sound.

Make the principles clear to yourself and when you get frustrated, go back and reread any section that seems important, or seek out new references. The principles are simple: each time you re-visit them you gain a clearer understanding.
"Bringing awareness to movement begins its improvement."31

The exercises in this handbook are intended to help you help your students to improve their flute-playing movement. Make up new ones, change these, have fun, and keep the joy of music and the spirit of exploration in all of them.

31Barbara Conable, What Every Musician, p. 35.
GLOSSARY OF MEDICAL TERMS

* refers to a term contained in the Glossary

A.O. joint: the Atlanto-occipital joint, which is between the top vertebra (Atlas) and the bottom of the skull (occiput).

Aorta: the major blood vessel carrying oxygenated blood out of the heart. It passes through the diaphragm.

Atlas: the top vertebra of the spinal column.

Biceps: the muscles of the upper arm which bend the elbow.

Clavicle: the collar bones; one on each side.

Deltoids: the muscles which form the shape of the shoulders; they attach to the collar bone, shoulder blade and upper arm bone.

Esophagus: the digestive tube which passes through the diaphragm on its way to the stomach.

Femur: the thighbone.

Gluteal muscles: the buttock muscles, which attach from the pelvis to the femur.*

Iliacus: a wide muscle inside the pelvis which joins with the psoas major* muscle to become the iliopsoas.*

Iliopsoas: iliacus* and psoas major* muscles join to become the iliopsoas, which then passes in front of the pelvic bones and attaches to the inside of the femur.*

Laryngeal pharynx: the part of the pharynx* that lies behind the voice box (larynx).

Lumbar: the lower-back area around the five largest vertebrae in the lower spine.
Nasal pharynx: the part of the pharynx* which lies behind the nose.

Oral pharynx: the part of the pharynx* that lies behind the mouth.

Pectoralis major: the broad upper chest muscles.

Pharynx: the passageway and muscles which form an opening from the back of the nose to the voice box.

Psoas major: a long muscle that lies next to the spine on each side. It has some fibers continuous with those of the diaphragm and joins the iliacus* to become iliopsoas,* which attaches to the inside of the femur.*

Quadriceps: the thigh muscles in the front of the upper leg.

Radius: the forearm bone which rotates around the ulna* when the palm turns over. When palms are facing up, both bones are parallel and the radius is on the outside of the forearm.

Sacrum: the lowest part of the spine, consisting of five vertebrae which are fused. The sacrum is suspended between the two pelvic bones.

Scapula: the shoulder blade.

Sternoclavicular joint: the joint between the sternum* and clavicle.*

Sternum: the breastbone.

Temporomandibular joint: the joint between your skull (temporal bone) and the jaw (mandible).

Thoracic: the chest area around the 12 vertebrae of the spine that support ribs.

Tibia: the large bone of the lower leg. The front of it is the shin.

Trapezius: the large back muscle, which goes from the neck out to the shoulder blades and down to the middle back.

Triceps: the muscles on the back of the upper arm which straighten your arm.

Ulna: the forearm bone around which the radius* rotates. When palms are facing up, both bones are parallel and the ulna is on the inside of the forearm.
Vena cava: the major blood vessel which carries de-oxygenated blood back to the heart, passing through the diaphragm.
RESOURCES

Constructive rest position is lying on the floor in a supine position with the knees up or perhaps with the legs draped over a large ball or placed up on a chair. (See figure 20) A book or a neck roll may be placed under the head for support. During the 10-15 minutes of this rest period, you can improve your Body Mapping by thinking about the location, size and function of the whole or parts of your body. You can also learn to release more muscles by thinking about more space, length or depth in various places. For example, you can think about the length and flexibility in your wrist; it will release and become more flexible as you think about it.

Balls are inflatable balls (sometimes called Swiss balls) that can be used for draping over, sitting on and resting legs upon. They come in many different sizes: having a few different sizes is beneficial for different purposes. Diameter sizes useful for musicians are 65 cm, 75 cm, and 95 cm. They can be found through physical therapy supply stores. Some large balls can also be found at toy stores.

Noodles are long foam sticks, about 3 inches in diameter, which are used as pool toys. If you place one along the length of the spine and lie on it, it allows the muscles along the processes of the spine to release. It can also be placed under any tense part of the body, such as in a U-shape under the pelvis. The weight of your body will help to release the muscles around the noodle.

Koosh balls are small balls made of colorful strings of elastic. They are wonderful for working on freedom in the feet and finding the “spring in your step” reflex in the ball of the foot. Sit and watch TV and roll your feet over them.

Skeleton: Make sure the skeleton you purchase is moveable at all the joints. The best one is the Johns Hopkins Miniature Skeleton, which can be ordered through medical book stores or through Johns Hopkins University. Cost is about $100.

Anatomy books:

The Atlas of Human Anatomy by Frank H. Netter, M.D. (see Bibliography)
Also available on CD-Rom.

The Anatomy Coloring Book by Wynn Kapit and Lawrence M. Elson. (see Bibliography)
APPENDIX

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Barbara A. Burger
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