Body Mapping Principles and Their Applications for Optimizing Pianists' Techniques

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Abstract

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This dissertation applies *Body Mapping* principles and their application to the discovery of how physiological movement is interrelated with sensory awareness. The whole purpose of this dissertation is to demonstrate how essential it is to pursue physiologically based music-making. To this end, it provides essential points about sitting-balance, presents anatomical information about the whole arm, as well as summarizes *Body Mapping* and, finally, evaluates the four most-practiced piano techniques of students ages six to twenty-eight.

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Acknowledgements

First and foremost, I want to thank God, who has given me an opportunity to praise Him through music and for the strength to finish my doctorate degree. My doctoral committee, Professor Craig Sheppard, Professor Jonathan Bernard and Professor Hannah Wiley, I thank you for your time and attention. I would like to express my deepest gratitude to my advisor and mentor, Dr. Robin McCabe, for her caring, patience, and guidance all throughout my study in the DMA program at the University of Washington.

I thank for their never-ending support and prayers my father, Rev. Jong Il, who is now in heaven; my brother, Daniel; and Sook-Hwa, my mother, who has dedicated her life to supporting my piano endeavors. Because of your sacrifices, your determination, and your love, you made my dream possible. I love you, Mom.

Finally and just as importantly, I dedicate this dissertation to my husband, Sam, who has given me loving support throughout this journey.

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List of Illustrations

Chapter One

Towards Optimal Technique

In this dissertation, I will introduce "Body Mapping" (Conable, 2000), a fairly recent trend in music education which uses anatomical information to help musicians play with the greatest physical freedom; then I will directly discuss those concepts in relation to the piano repertoire. There are three significant reasons for choosing this topic: 1) virtuoso technique involves physical freedom; 2) physical freedom can be achieved by applying our understanding of self-representation of our bodies; and 3) virtuoso technique and physical freedom are both needed for complete technique. Since my major focus in this dissertation concerns what factors lead to complete technique and how to accomplish it, it is imperative to introduce a brief discussion of the definition of "technique." "Technique" means the manner and ability with which an artist, writer, dancer, athlete, or the like employs the technical skills of a particular art or field of endeavor. The word "technique" alone, as used by pianists, connotes the elements of accuracy, speed, strength, agility, and coordination. When a musician uses "virtuoso technique," it means comprising all of the above. Considering that our best performance is more likely to happen when there is no unnecessary tension in our body, virtuoso technique requires both physical freedom and skill.

According to Larry Graham, our purpose of producing beautiful tones and our need to have physical freedom are alike for all pianists. But <u>how</u> we acquire these goals cannot be the same, since our bodies are different:

> In the three decades or more of my experience hearing pianists, I have heard beautiful tone and sound produced from those who were short and those who were tall, those who sat low or sat high, from those who were fat and those who were more slender, from those who were relaxed and from those who were tense, from those with large hands, small hands, bony hands, flabby hands, using curved fingers, flat fingers, flexible motions and minimal motions. Every one of those hundred pianists had a different physical approach. What these hundred pianists do have in common is the final product of a beautiful tone and sound. . . . Apparently, this control can occur through a variety of physical means (Graham, 1992, p. 43).

The reason a pianist needs to study the structure, function and size of his/her own body is so that he/she will have a clear and specific understanding, self-representation, of his/her body. This will lead to a pianist's having the knowledge of how to use his/her body and hands in an optimal way to achieve virtuoso technique. Writing in 2012, Lisa Marsh discusses "Body Mapping":

> Body maps are the internal representation in our brains of the structure, function and size of various parts of our bodies. They have been explored by neuroscientists for decades and more recently have been incorporated in a field of music study termed "Body Mapping." This field of somatic education was discovered by Barbara and William Conable[1]* (p.11).

This paragraph gives a pertinent explanation of both "body maps" and "Body Mapping" and how they are related to one another. "Body Mapping" is essential for musicians so they can correct their habits using anatomical information since their neuronal self-representation governs their movements. Having an adequate and accurate internal representation is essential for musicians to play with more ease and more virtuoso technique.

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[1]*Founder and former-president of Andover Educators (1999), a network of music teachers saving, securing, and enhancing musical careers with accurate information about the body in movement.

These are remarks from famous musicians, Busoni, Galamian, Giesking, and Gerig, regarding technique:

> *Technique in the truer sense has its seat in the brain, and it is composed of geometry— an estimation of distance — and wise coordination* (Busoni, 1957, p. 80).
>
> *"Naturalness" should be the "first guiding principle" and that "'right' is only what is natural for the particular student, for only what is natural is comfortable and efficient"* (Galamian, 1961, p. 5).
>
> *In order to attain a natural manner of playing the piano, that is to say, with the least possible strain and exertion, it is of the utmost importance to learn to exert the muscles consciously, and, what is of still greater importance, to relax them consciously. My manner of accomplishing this differs from that of many other pedagogues* (Giesking, 1972, p. 12).
>
> *There cannot be a truly great performance without a masterful physical technique. . . . Naturalness is, without a doubt, the final determinant of a valid piano technique. Such a technique operates in harmony with the laws of nature—with a special regard for those laws concerned with physiological movement and muscular coordination* (Gerig, 2007, p. 3).

While these famous pianists were developing their individual virtuoso technique; they became aware of the symbiotic relationship between physical freedom and coordination of movement and believed those two seem to correlate. According to Giesking, his natural manner of playing the piano differs from that of many other pedagogues. We must discover our own way of the "natural manner of playing the piano" (Giesking, 1972, p. 12).

This is the reason why pianists need to know about body maps, so that they can govern their own movements. I want to discover what piano techniques we would use differently when we gain the knowledge of Body Mapping (self-representation). Here is the chart that I have made comparing and contrasting two different techniques. The left column contains incorrect techniques and technical habits that I observed from hundreds of students, ages six to twenty-eight. In the right column, I summarize the techniques that I have observed students evolving as they integrate Body Mapping knowledge into their piano playing.

Myth Technique/Technique Habits	**Body Mapping Technique**
• Hand Shape: making a round hand shape as if you imagine holding a ball or egg inside of the palm • Fingers: Straightened fingers	• Having a natural hand shape • Accessing all three finger joints
• Back of spine should be as straight as the alphabet letter I	• Mapping of natural spine and its relationship to the torso
• Relaxation Shoulder: put your shoulder down to the lowest point it can go - shoulder exercise: doing "I don't know" gesture for relaxation of the shoulder	• Gaining Balanced Shoulder - shoulder exercise: gently rolling between inward motion and backward motion and upward and downward
• Thumb: mapping the hand orientated by thumb side, misunderstanding of the thumb length, and trying to play thumb by using only the finger	• Know where the thumb begins and using forearm rotation to play the thumb
• Finger isolation: using only the fingers, not getting any support from the whole arm when playing	• Access of the whole arm: finger, wrist, and arm as the whole unit
• Trying to play 5th finger by using only the finger	• Play 5th finger by forearm rotation to create a fuller sound

• Trill: Fix the wrist at one position and using only fingers to create the sound	• Trill: use of various wrist movements along with forward and backward shaping and rotation
• Forte Chords: pushing the keyboard harder to create a bigger sound	• Forte Chords: aware of tactile sense and aware of the point of the sound. Realizing the depth of the keyboard
• Non-playing fingers: fixed position of hand shape and fingers. Not being able to release the note after playing it	• Non-playing fingers: ideal intention is to have free open hand with no tension in fingers when they don't play

Because complete virtuoso technique derives directly from having physical freedom and coordination of movement, I will provide an overview in the following chapters of Body Mapping technique and its application to a collection of musical examples. In this first section, I discuss how physiological movement is interrelated with psychological awareness. In the second section, I provide the four sitting-balance points; and I will compare and contrast two different ways in which to sit in balance.

As Marsh states in her book *Fundamental Principles of Coordinate Movement for Pianists*, "Balance is not a position—just a place of no muscular work which affords the greatest variety of movement" (2012, p. 12). Pianists are obligated to move constantly: (1) on the keyboard, (2) when sitting. They also need to create the different body movements in order (1) to accomplish and perform the specific passages which require different piano techniques, and (2) to present in real performance the imagined sound in our mind. This is why balance cannot be a fixed position, as Marsh compellingly explained the term.

In the third section, I present anatomical information about the whole arm and suggest applications that support the idea of the arm as a single working unit. In the fourth section, I summarize Body Mapping and examine the four most-practiced piano techniques of the students whom I have observed. In the final section, I discuss how essential it is to pursue healthy music-making.

Chapter Two

An Approach to Optimizing the Pianists' Sensory Awareness

Why is sensory awareness important? Why am I using the word "awareness"? What is my purpose in exploring the capacity of sensory awareness? By end of this chapter, these questions will be answered.

It goes without question that people live their lives differently. One type of person gives absolute self-aware and single-minded concentration to one thing without paying attention to the all the things that are happening around him or her. Another type of person is seemingly sensing everything. Obviously, I am describing two extremes: the hyper-focus personality and the multi-sensory personality. I realize that most people will sometimes exhibit one extreme or the other. In the world of pianism, certainly our focus has to be multi-sensory. A pianist must look at the score, be aware of shape of the fingers, hear the sound and be able to analyze and adjust to it, and, most important, be able to be aware of and determine the quality of his/her movement. Additionally, pianists often need to play (collaborate) with other instrumentalists. In any given moment, pianists must have more than single-focus concentration.

Multi-sensory awareness is the state or ability to perceive, to feel, to be conscious of events, objects, movements, sensory patterns, and, thus, have the ability to modify or change them. The antithesis of this is hyper-focus concentration, which means the act or process of the fixing of close, undivided attention. It requires paying attention to only one thing, which can easily inhibit or eliminate awareness of the surrounding atmosphere. When my students say they

are experiencing pain after playing a musical instrument extensively, I often ask them, “Do you know what part of your body is tired after playing this music? Do you know at which passage you felt tension or tightness in your muscles?” Ninety percent of the students answer, “I don’t know.” They have been so concentrated on their playing that they block out everything else. Their only goal is to play through the music. Being aware of their physical status is not an issue for them.

In *Alice’s Adventures in Wonderland (Carroll, 1865)* the King of Hearts describes what students who lack awareness of their own physical condition while they are playing should not do. Edward Cone comments on this description as follows:

> The first and last word on this subject was spoken by the King of Hearts. Although he was telling the White Rabbit specifically how to read verse, his advice speaks clearly to all performing artists: “Begin at the beginning, . . . and go on till you come to the end: then stop” (Cone, 1968, p. 12).

How many things do we do in everyday life which are simply the result of hyper-focus concentration, which is at the expense of being multi-sensory aware of learning and performing.

Humans have six senses: visual (seeing), auditory (hearing), tactile (touch), kinesthetic (movement), gustatory (taste), and olfactory (smell). The location of the body’s receptors for these six senses can be mapped. The visual sense is located in the eyes; the auditory sense is located in the ears; the tactile sense is located in the skin; the kinesthetic sense is located in the muscle and connective tissue at joints; the gustatory sense is located in the tongue; and the olfactory sense is located in the nasal area.

Sense	Visual Seeing	Auditory Hearing	Tactile Touch	Kinesthetic Movement	Gustatory Tasting	Olfactory Smelling
Receptor	Eyes	Ears	Skin (finger tips)	Muscle and Connective Tissue at Joints	Tongue	Nasal Areas

Now, this paper raises the following questions: What are the relationships that connect body senses and conscious awareness in the pianist? Are these relationships relevant? It is the purpose of this study to answer these questions and confirm the valid relationship.

The pianist needs to know (1) his/her body map, and (2) the nature of the composition he/she will be using their body to perform. Therefore, pianists need to consider the following questions: How do we know if we truly understand a musical composition? How do we achieve such an understanding? To understand a composition in depth, one must research the composer of the composition: Who is the composer? Why did he or she compose this music? Under what circumstances was it composed to make it this particular music? At what stage of the musical career did he or she compose it? Who would have been strong musical influences on the composer? There surely is a relationship between the composer's life and his or her composition. To understand a person's behavior, we need to know how the person has lived his/her life, his/her relationships, and any other experiences that have influenced who the person has become. Past experiences form character, personality and behavior. Thus, after answering these questions, one would be better able to understand the composition.

The next step is to perform the music. What elements are needed to make music? Clearly, we need instruments and our bodies. As pianists, we need to use our eyes, ears, tactile sense and kinesthetic sense. We use our kinesthetic sense to determine the condition of our muscles and the condition of connective tissues which are at our joints. As a teacher, I have observed that my students are familiar with visual, auditory and tactile senses. However, they are not aware of their kinesthetic sense, even though they have relied upon this sense. Obviously, pianists do not need their gustatory and olfactory senses when they play the piano, although they do use their visual, auditory, tactile and kinesthetic senses. If they are not sure how to distinguish between the tactile and kinesthetic sense, they can begin to feel their kinesthetic sense by doing this exercise:

> Close your eyes and raise your hands over your head. Now, wiggle your fingers and notice how much information about that movement is available to you. You can sense when you start, when you stop, the speed of the movement, what is happening in the palms and the wrists, whether your arms feel light or heavy, and more.
>
> Your awareness of these movements comes from your kinesthetic sense.[1]

Here are three questions that students should ask themselves to observe if they are aware of their senses including their kinesthetic sense:

1. Which receptors do you use to play music?

2. Which senses do you use most often?

3. Can you differentiate between the tactile and kinesthetic senses?

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[1] What is the meaning of "kinesthetic"? "Kinesthesia" comes from the Greek words: "kinema," which is to move, and "esthesia," which is to perceive. "Kinesthesia" means to perceive movement.

As I mentioned previously, the majority of students who were having tension-related problems were either not trained to perceive kinesthetic movement or were not aware of it. It is important to know not only where the movement should come from but **how** it should come. Should the movement be free or tense, light or heavy, balanced or imbalanced, and easy or effortful? By raising these questions, the students begin to perceive the quality, size, and the location of each movement.

Movement	**Detailed Question**
• Where	• Here/There
• How	• Free/Tense • Light/Heavy • Balanced/Not • Easy/Requiring effort
• Size	• Small/Large

We have now looked at human senses and their body receptors. We also have looked at the meaning of "kinesthetic" and how we use that sense. We will now move to the next step by asking questions about the training of all the relevant senses.

Pianists have been trained to refine their auditory sense. Familiar with a perceptive auditory sense, they will ask, "How is my timing?" "How is my shape of phrases?" "How are my legato connections?" "What do you think of my pedal?" "Have I captured the character of the piece?" After answering the above questions, the student should adjust his/her performance to better represent the composition.

The teacher will also need to ask questions to encourage and develop the kinesthetic sense: “What are you feeling in your arm; are you feeling the weight of the arm?” “Does anything change in the muscles of your back as you play that passage?” If students sense the loss of balance or a tightening in their back, the students are kinesthetically discerning at that moment and time; and, thus, they have the opportunity to bring themselves into balance, loosening tightness in their back because they are aware of it. Because they have developed the kinesthetic sense, students have the opportunity to bring their body into balance and to respond to create the correct tightness in their back. Ideally, pianists’ physical conditions need to be balanced. This allows their mind to be in balance. Thus, in addition to relying upon on their auditory senses, they must constantly work to check on their physical condition as well.

To optimally perform, a pianist must combine the visual, auditory, tactile, and kinesthetic senses. The auditory sense tells the pianist the quality of the sound, while the visual, tactile and kinesthetic senses tell the pianist the quality of his/her movements. The refinement of a student’s physical movements is as important to expressing the emotional meaning of the composition as it is to creating the quality of the sound. For example, a note may be struck twice with equal volume; but using two different physical approaches or gestures, such as straight striking from the air or striking with a weighted arm using the wrist, surely creates different tones. Being aware of their combined body senses helps pianists better discriminate their movements toward their goal of efficient physical freedom, which helps pianists create meaningful, effortless music.

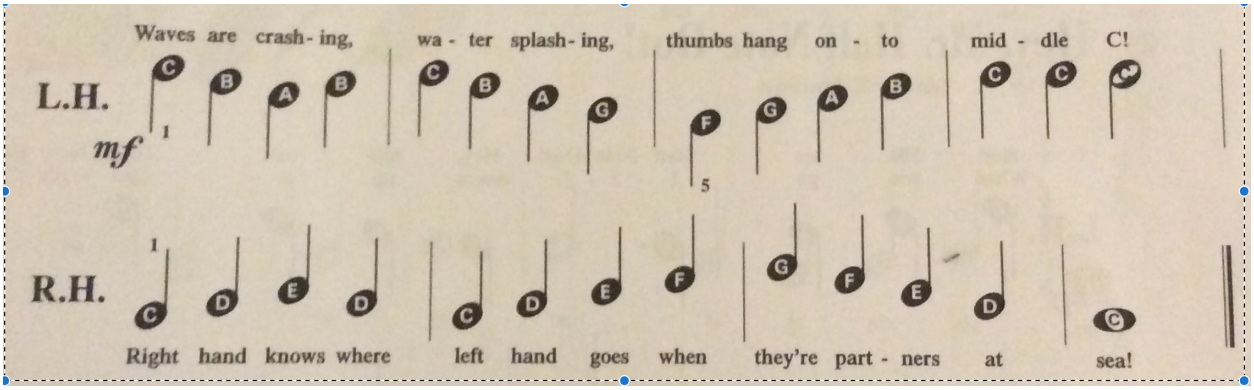

Figure 1: Partners at C by *Piano Adventures* Lesson Book (Primer Level)

Taking a look at Figure 1: This musical example is from a beginning student's piano method book by Nancy and Randall Faber (1996, p. 27). Even though this is a simple melody, we can use it to teach the beginner students how to use their four senses and receptors. From this example, (1) we can encourage the students to use their visual sense by reading the movement of the notes and the lyrics; (2) we can guide them to use their auditory sense to hear if they are playing the correct notes; (3) we can ask them to use their tactile sense to feel if their fingers are standing on firm finger tips; and (4) the students can use their kinesthetic sense to feel the various movements of their hands and wrists as they play the notes up and down on the keyboard.

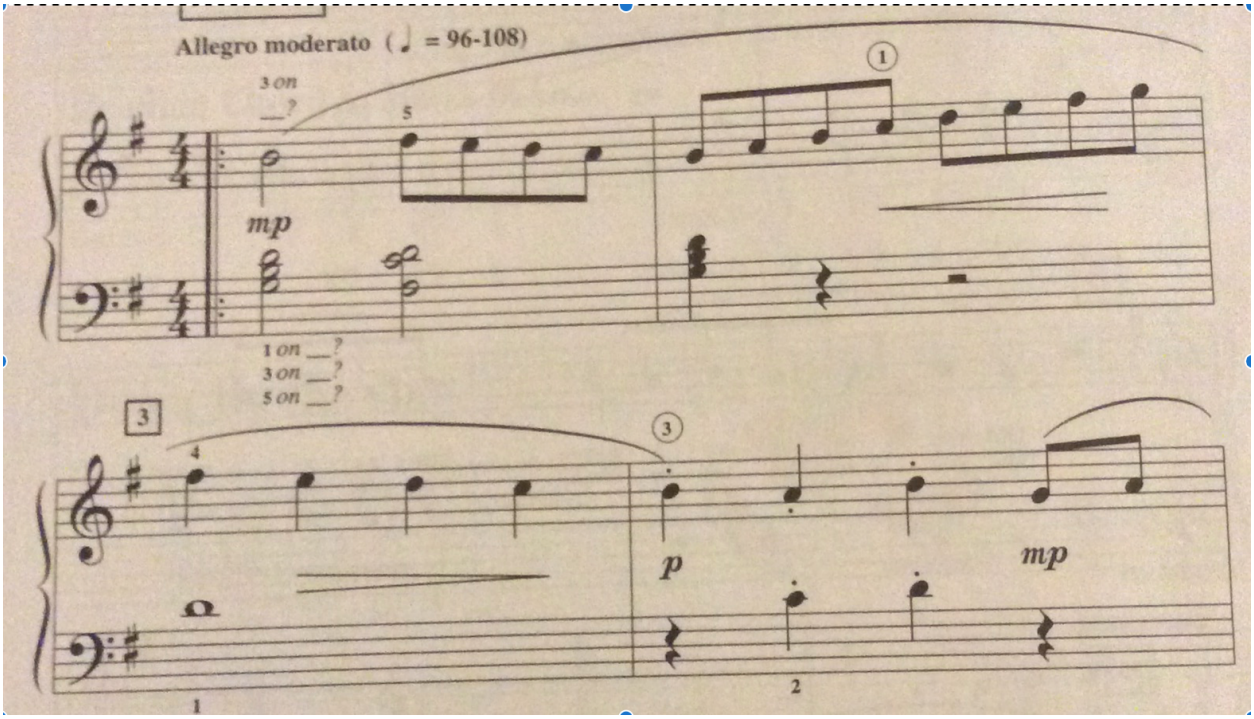

Figure 2: Horse Drawn Carriage by *Piano Adventures* Lesson Book (Level 2B)

The second example is from the intermediate level of the piano method book by the Fabers (1997, p. 28). As you can observe, the music now has a (1) dynamic markings such as *mp*, crescendo/decrescendo, and *p;* (2) articulation markings such as slurs and staccatos; lastly (3) tempo marking such as *allegro moderato* with metronome marking such as 96-108 quarter notes in a minute. Due to the complexity of markings on the score, the students are required to use their visual sense to follow the piece meticulously in terms of playing the correct notes; playing the melodic line smoothly when it has a slur over it; playing detached notes when the notes have dots over or under them; and lastly, following those dynamic markings. As notes ascend, the sound gets fuller and as notes descend, the sound gets softer (in measures 2-3).

The auditory sense is greatly needed as well. The students need to hear sensitively and to be able to discern whether they are making a smooth or a detached sound. Additionally, adjusting to the changes in the dynamic markings, they use their auditory sense to judge whether they are creating different sound levels and qualities. Using the kinesthetic sense in this musical example is indispensable; it is of utmost importance to employ when students are creating different colors of the sound. For example, to make a legato melodic line, students need to use wrist flexibility along with follow-through of the arm movement. To create crisp and detached staccato sounds, students need to use the rebound technique from the elbow joints. As for the tactile sense, they can use different parts of fingers to create different sounds; for example, for more lyrical phrases, students can use finger cushions (soft part near the top of the finger). For creating short staccatos, they will need to use firm finger tips.

Our senses are irrevocably interrelated when making music. One sense cannot be separated or excluded from another. For example, the auditory sense cannot be the single sense used to make music. Pianists need to use the visual, tactile, and kinesthetic senses to make the music, and they can evaluate the performance when they have a highly developed auditory sense. The students who can do this can discriminate and respond to every situation in their performances. For example, “Is my tempo steady?” “Is my left hand moving faster than my right hand?” “Is the melody line well projected?” “Is my pedal blurry?” Aware of all this, the students can perform at a higher level.

A greater sense of awareness is an absolute necessity for enhancing a student's performance. Awareness is also a key element in life itself, interacting with others, perceiving how our own actions are being received, and maintaining strong interpersonal relationships.

Chapter Three

The Core of The Body: Sitting Balance

At the very beginning of a new student's lesson, I first introduce the mechanics of the piano: the basic structure of the instrument, how the piano creates sound, and the function of the three pedals. The next element I introduce is sitting, which must be balanced: For balanced sitting, the student needs to learn how to find the correct height of the bench for him/herself, how to find the correct distance between the piano and him/herself, and lastly how to balance the student's body when sitting at the instrument using the body's four balance points. Here readers are likely to ask, "Is there one correct way to sit?" I am confident in saying that, by the end of this chapter, piano students will know how to find their own optimal position, i.e., one that is fully balanced. In this chapter, I introduce the anatomical parts of our bodies as well as our four balance points: (1) the atlanto-occipital joint, (2) the spine, (3) the arch of the pelvis, and (4) the arch of the foot. My aim is to demonstrate the relationship between all these points in order to achieve a balanced sitting.

The first balance point is at the atlanto-occipital joint, known as the A.O. joint (Figure 3). The head balances at the top of the spine at the A.O. joint where the atlas (the top vertebra) meets the occiput (the base of the skull). The A.O. joint is slightly below the ear canal. Activating the A.O. joint, we can tilt our heads slightly. When we turn our head from side to side and nod, movement occurs between the atlas and the occiput.

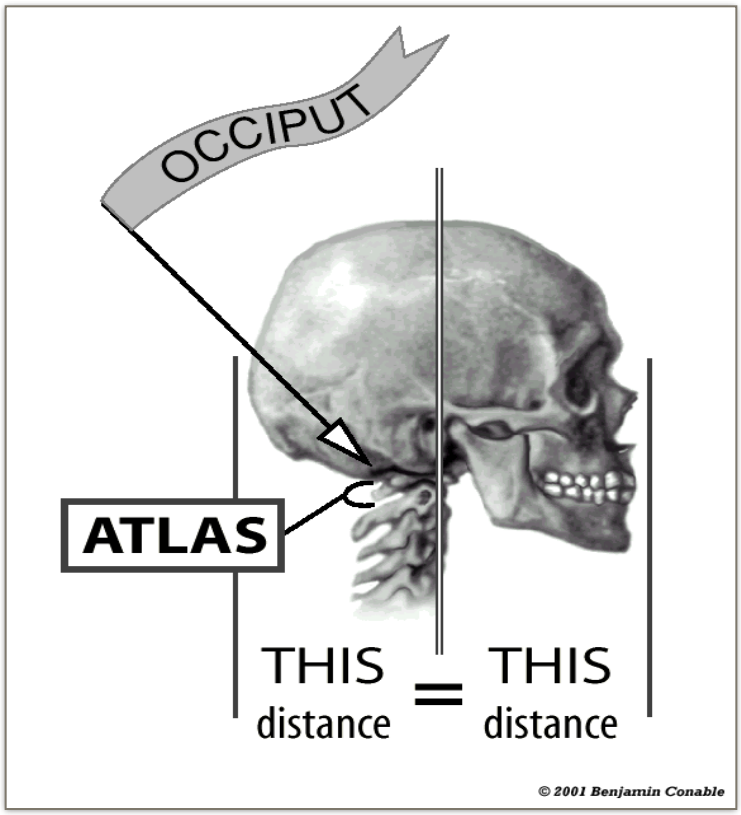

Figure 3: The A.O. Joint[1] (Conable, 2000, p. 6)

During the lesson, I ask a question of each student: "What part of your body becomes tired after a long period of practice?" Students answer that there are several of parts of their body where they can experience fatigue. For instance, due to long hours of sitting, their buttocks can become painful, their lower back can ache, their shoulder muscles get tired, and their neck muscles become tightened. I then ask a question to the specific students who were reporting tightening in the neck: "Where is your neck?" Ninety percent of my female students point to the

[1] The GIA Publications, Inc. and Barbara Conable generously granted me a permission to use the illustrations for this document. The copyright permission applies to all the illustrations used in this dissertation.

place of the neck where they wear necklaces. My male students point to where the collar of their shirt touches their neck. There are a few other common misapprehensions: (1) the back of the neck and around to the front of the throat; (2) the neck begins below the jaw; and (3) neck muscles are only superficially deep like the layers on an artichoke and that only a superficial, tiny portion of their neck muscles represent their neck. If these students do not use all of their neck muscles, their bodies will compensate for that loss, thereby creating unnecessary tension in other parts of their body. It is important for students to know about the trapezius muscle, where the neck muscle and shoulder muscles meet (see Chapter Four).

Take a look at Figure 4: Our neck muscles are complicated, layered, and long. If one spot becomes tense in the neck muscles, the shoulder muscles and arm muscles all react to the same effect. If students want to release unnecessary tension in their upper bodies, they first need to check whether their head is balanced; then they can determine the status of their neck muscles.

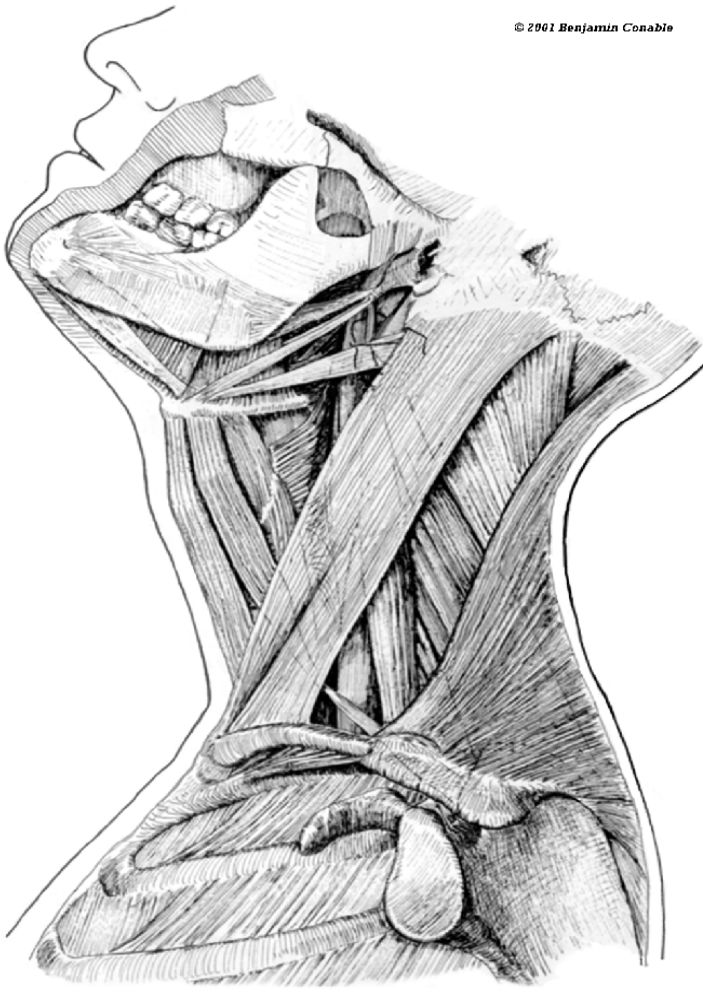

Figure 4: The Neck Muscles(Conable, 2000, p. 7)

One of the pioneers of somatic education (study of the body in motion) was F.M. Alexander (1869–1955). He discovered the effect of neck tension on the rest of the body. As mentioned previously, at the A.O. joint, our head is balanced over it; and because the A.O. joint is surrounded by neck muscles, we can say that the neck muscles have significant responsibility in affecting the whole body:

> Laws of Human Movement I: Habitual tensing of the muscles of the neck results in a predictable and inevitable tensing of the whole body. Release out of the tensing in the whole begins with release in the muscles in the neck (Conable, 1995, p. 4).

Figure 5a: Map of Head Imbalance

Figure 5b: Map of Head Balance

I notice that most students lose the sense of balancing the head when they are learning a piece or doing sight-reading exercises. They tend to put their head closer to the music, in a similar way to a turtle whose head is emerging from its shell. In doing so, they are pulling on their neck muscles, which are connected to their shoulder muscles (Figure 5a).

As Alexander discovered, if the neck has excessive tension, then the body will be in inadequate balance as well. It is absolutely key to understanding how one local tension of the body will affect the rest of the body. Tensing the neck muscles will put more unnecessary tension on our shoulder muscles and, therefore, will affect our whole body.

The second balance point for the body is that of the spine. One can examine how knowledgeable we are about the structure of our spine by drawing it on a piece of paper. I once conducted an experiment by having current students, ages seven to eighteen, draw their spine.
I wanted to compare what they visualized, their spine to be with the actual anatomical structure of their spine. These drawings show their various visualizations about their spine:

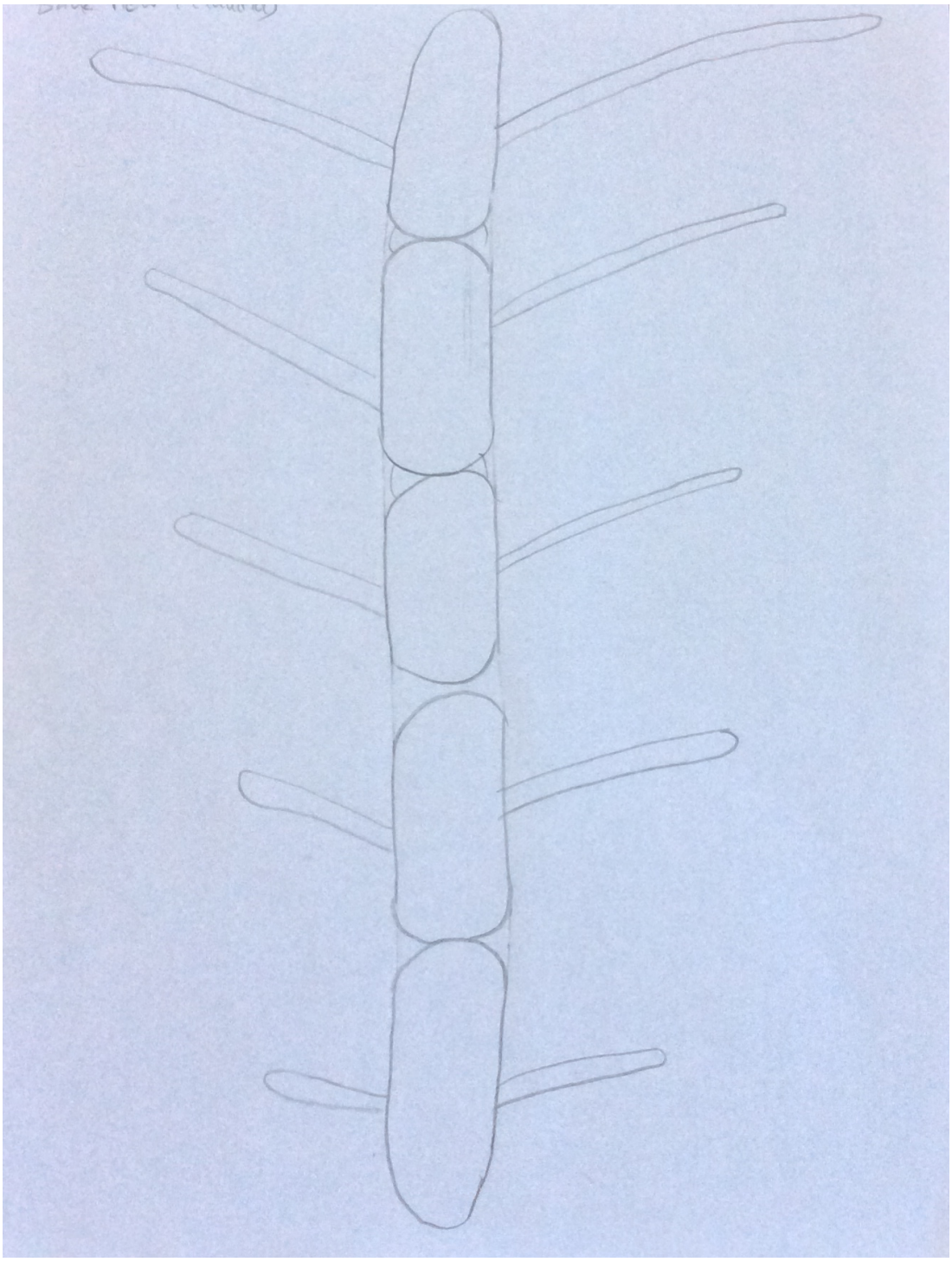

Figure 6: Student 1

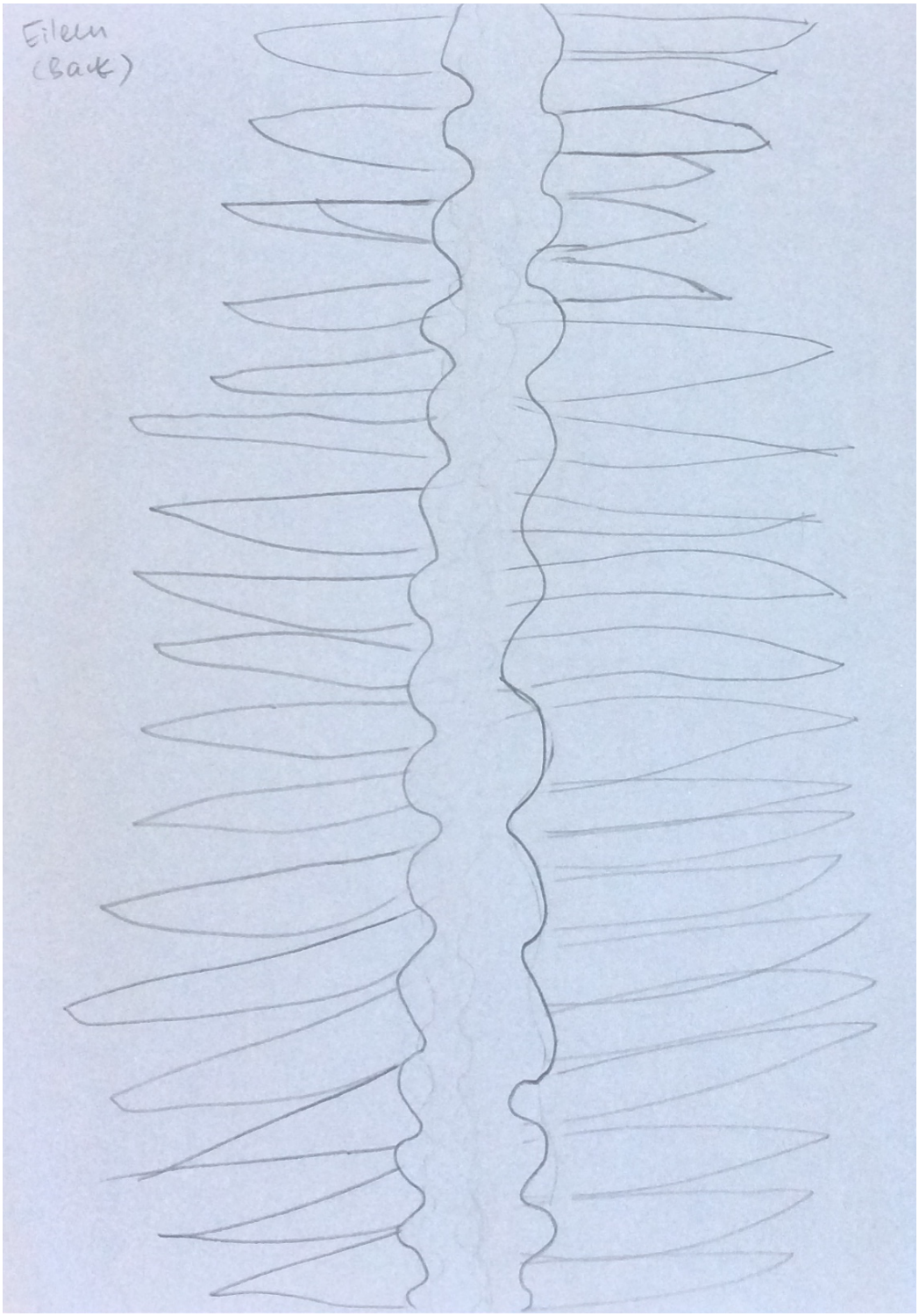

Figure 6: Student 2

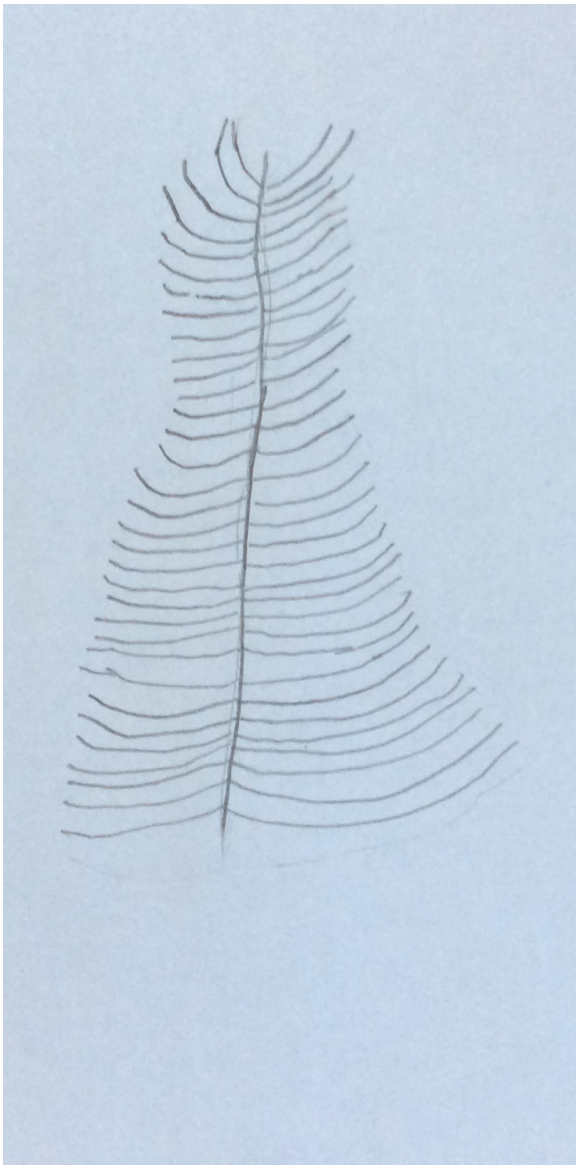

Figure 6: Student 3

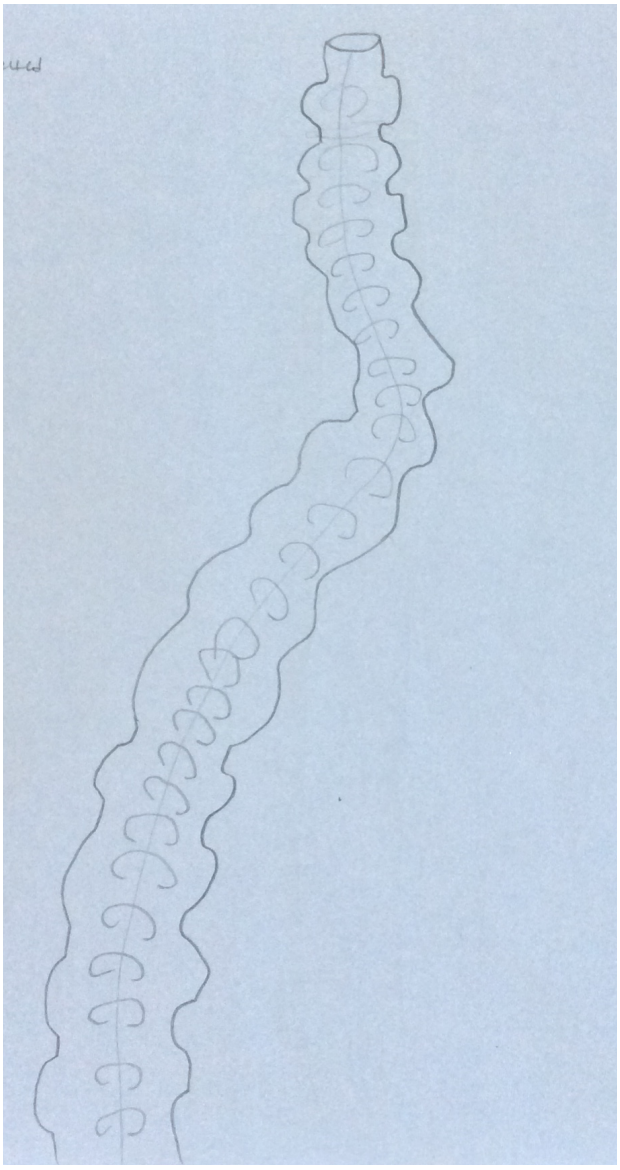

Figure 6: Student 4

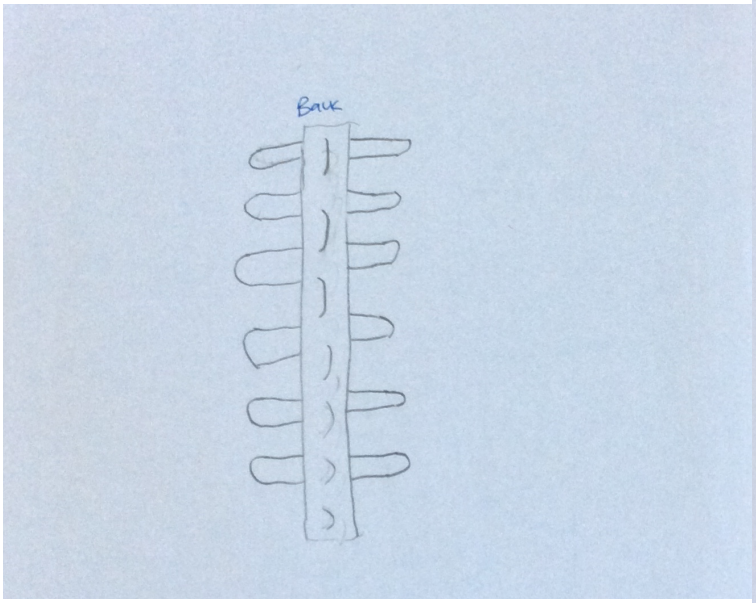

Figure 6: Student 5a

Back View

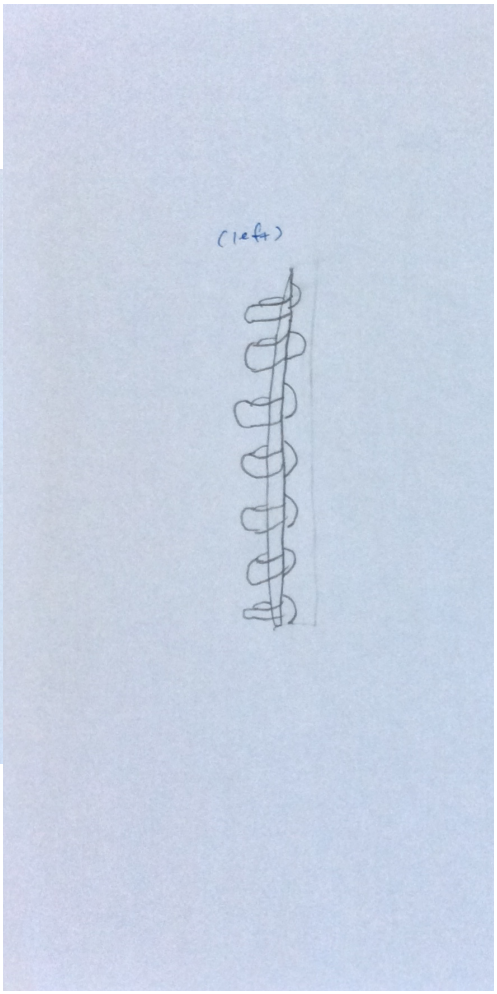

Figure 6: Student 5b

Front View

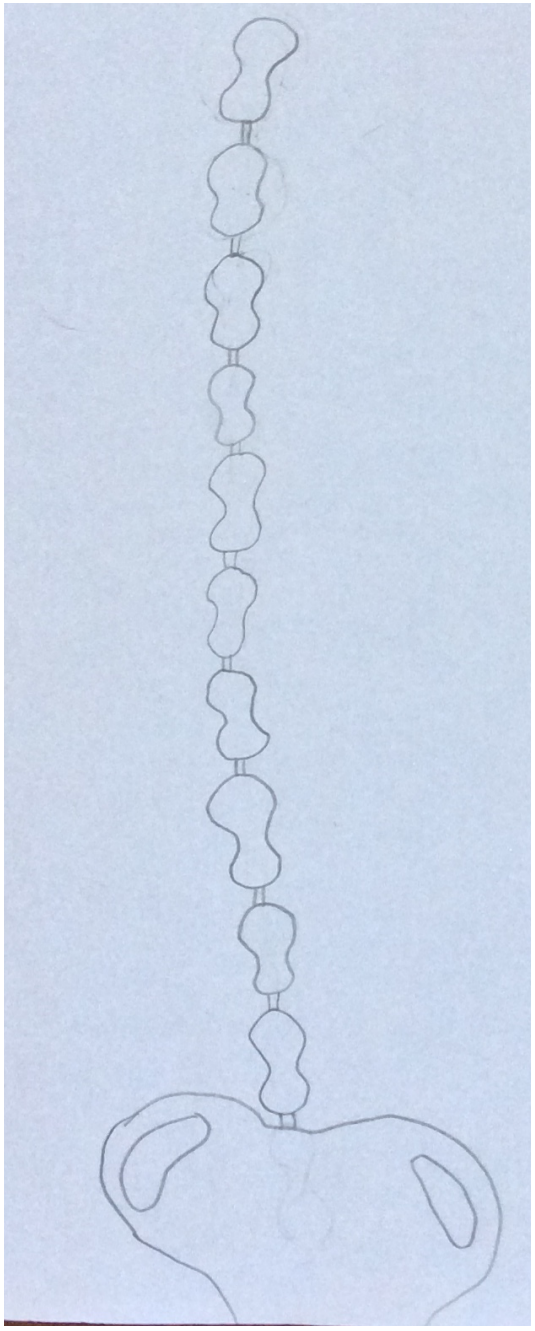

Figure 6: Student 6

Back View

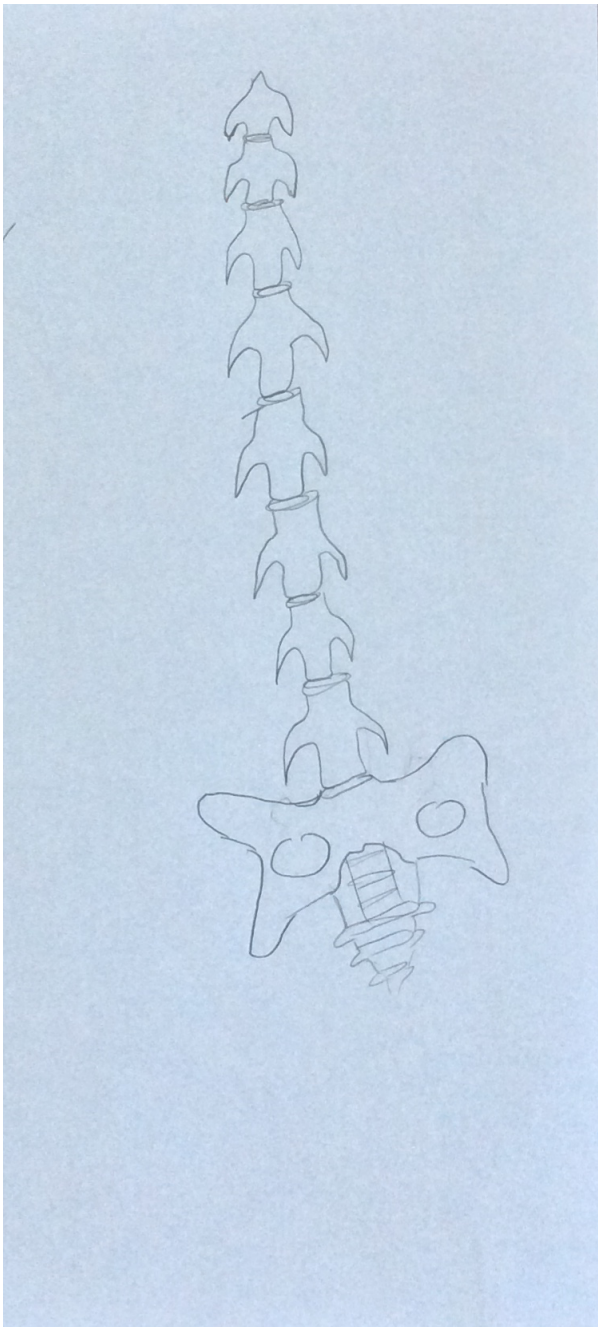

Figure 6: Student 7

Front View

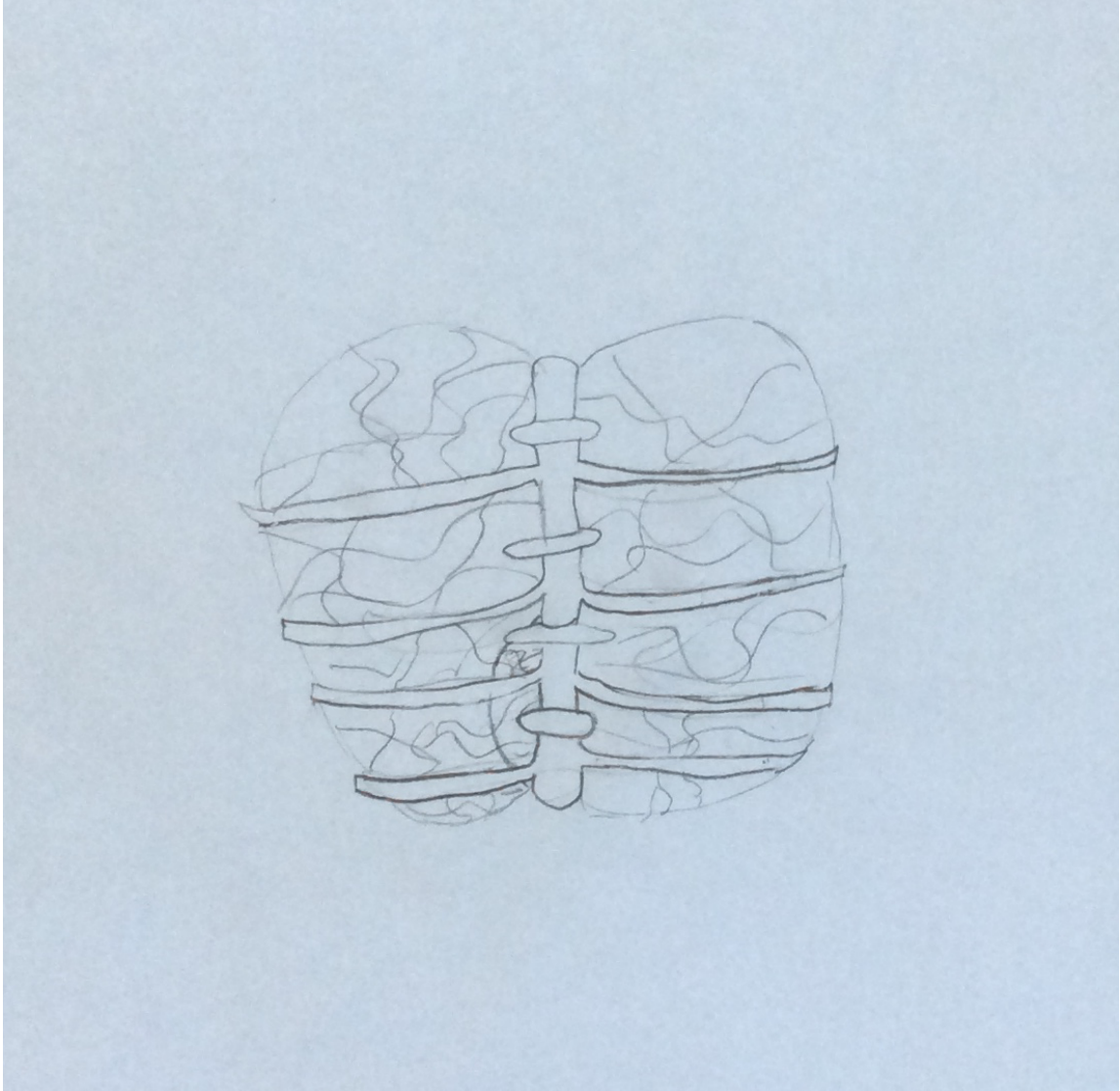

Figure 6: Student 8

Student 8 was nine years old when she drew her spine. Among all the students, she was the only one who included the blood vessels inside the human body. It was fascinating to see that she adopted the anatomical information from her physician mother. As you can observe, the majority of these students drew the spine as somewhat segmented, thin, straight and attached to the ribs. After they finished the drawings, I asked the students, "Where does the weight go? Does

it go in the front of the spine or in the back of the spine? What part of the spine bears the weight?" All the students answered, "The back of the spine." Is it really true that weight is borne at the back of the spine? As you can see in Figure 7 and 8, the spine is segmented, curved and becomes thicker as it goes lower. The front part of the spine toward one's stomach (5 lumbar vertebrae) is the part that has the function of weight-bearing and a weight-delivery capacity. The back of the spine houses the spinal cord and allows nerves and blood vessels to pass through it.

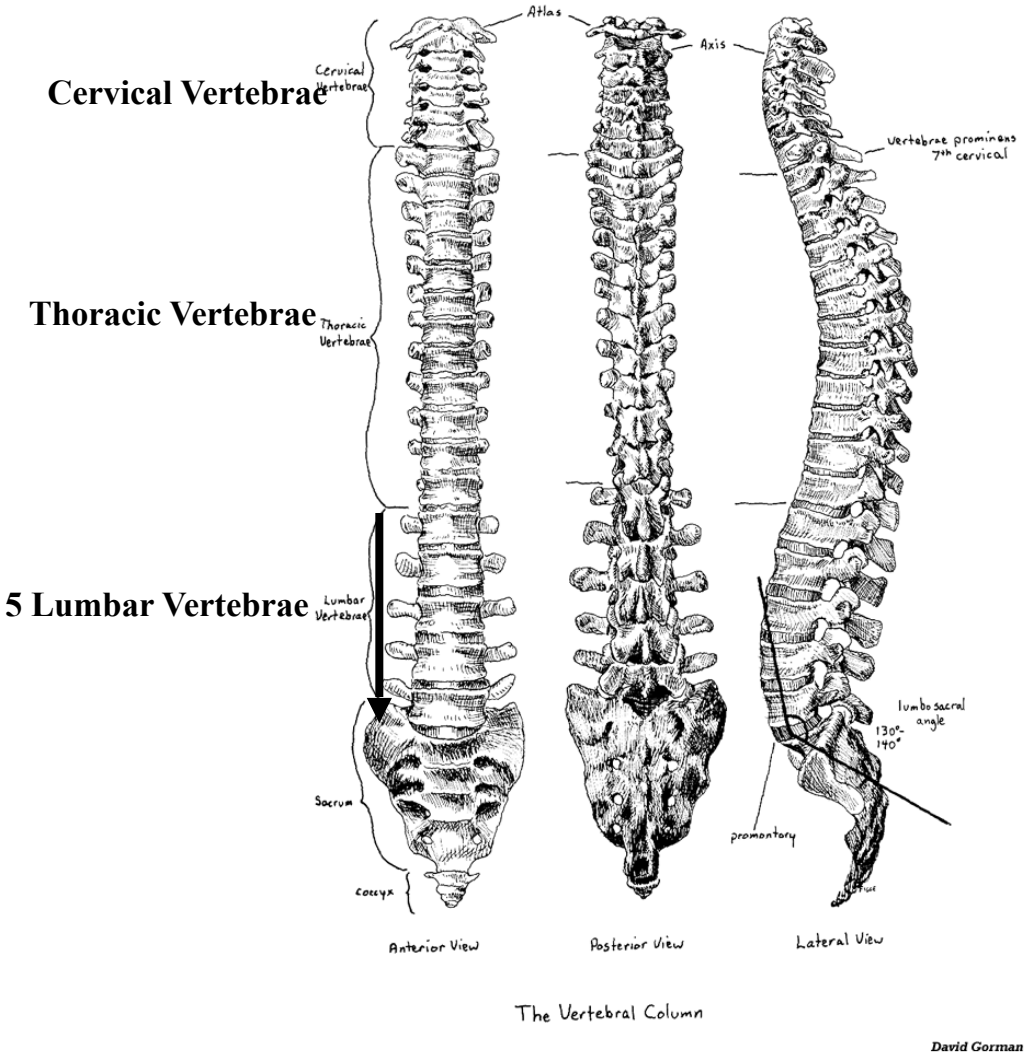

Figure 7: The Spine (Gorman, 2014, p. 46)

Taking into account how the students answered the question in the previous paragraph and how they mapped their weight bearing and weight delivery on the back of the spine, they can see here in Figure 8 that their mapping would naturally stress the nerve system. This is because their weight is actually transferred to the back of the spine where nerves pass through.

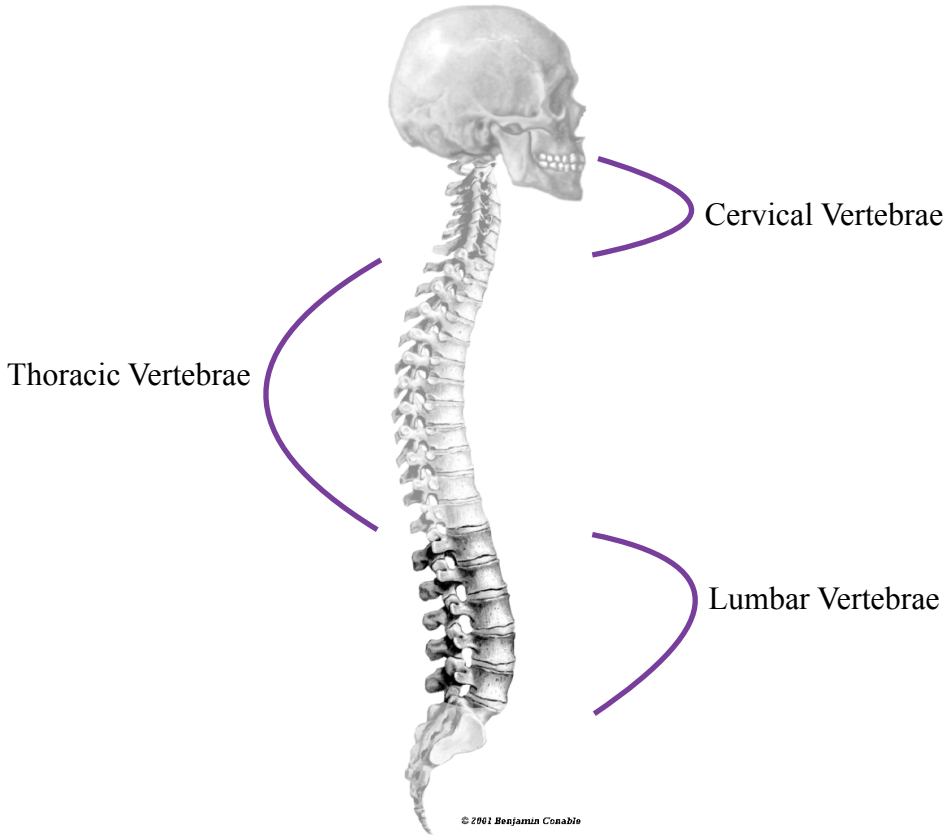

Figure 8: Names of The Vertebrae (Conable, 2000, p. 20)

This will eventually pinch the nerves and spinal cord and restrict their function. When sitting for hours at the piano, these students could indeed experience unnecessary pressure and strain on their lower backs.

At the A.O joint, our head (neck) and spine (body) meet. As one can observe, the spine is located in the back of the body and the spine supports the torso. Due to this structure, the spine will be free and supple when our head is in balance:

> Law of Human Movement II: In movement when it's free, the head leads and the body follows. More particularly, the head leads and the spine follows in sequence (Conable, 1995, p. 7).

In *What Every Musician Needs to Know about the Body,* Barbara Conable presents the principles of essential movement of the spine, calling them "The Laws of the Spine" (2000, p. 19):

1. The head must lead.
2. The vertebrae must follow in sequence.
3. Movement should be distributed across the whole spine, not concentrated in part of it.
4. The spine must be free to lengthen and gather, 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).

These four principles allow students to optimize the use of their spines for buoyancy, which helps them find balance. The next significant key to balance is identifying the lumbar balance point, where the spine is the thickest, directly below the A.O. joint.

There are two major kinds of sitting posture I have discovered in working with my students. Student *Type One* will move the thoracic part of the spine forward and cause the lumbar region to arch inward toward the front. Putting hyper-tension on the lumbar region, this will cause a tense neck and intensify pressure on the lower back.

This position is called "b*ack-orientated sitting*" (Mark, 2003, p. 49). In Example 9a, the student is making her back overly upright and straight. A curved line has been drawn through the illustration so one can actually see how her lumbar vertebrae are hyper-arched.

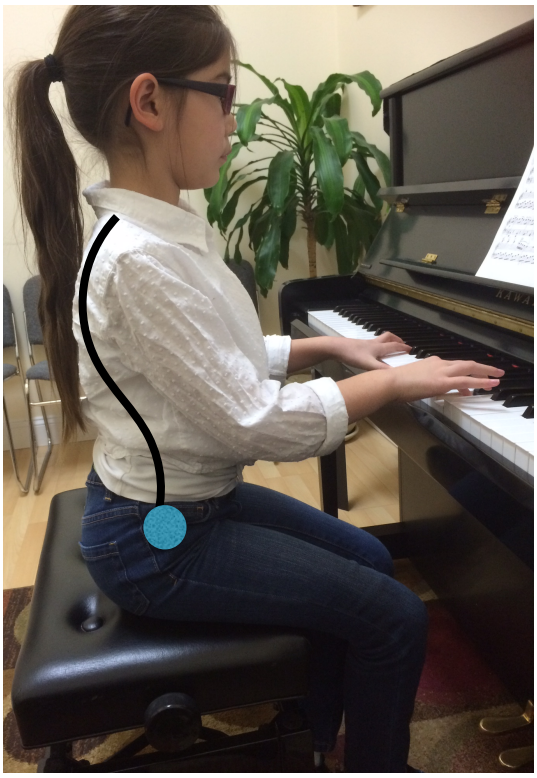

Figure 9a: Back-Orientated Student

Figure 9b: Balanced Sitting Student

Another student might move the spine outward, which will cause the back to slouch. This student will have a difficult time adjusting head balance, and shoulder tension will develop.

Figure 10 is of a student sitting on her tailbone. She is trying to achieve a nice hand shape and a balanced back, but she will still have trouble being in balance because she is not sitting correctly. She is resting more on her tailbone than on her buttocks (sit bones); her buttocks are not fully resting her weight against the solid surface of the piano bench.

Readers can recognize the posture in this picture. If we are trying to sit mainly on our tailbone, we will automatically project the same posture as the student shown in this image. Sitting this way on the tailbone, the lumbar vertebrae will not be in balance; so the weight will not be distributed properly. Most of the torso weight will create pressure on the back of the lumbar vertebrae and, thus, cause unnecessary pressure on the lower back.

Figure 10: Slouching Back

The pianist and piano educator, Thomas Mark, commented on the importance of balanced sitting:

> Balanced sitting: the weight is delivered over the hip joints and two sit bones. This follows the laws of the spine. "The head leads, the entire spine moves, and the pelvis moves in relation to the legs" (2003, p. 50).

Figure 9b/11:

Balanced Sitting

This is an important principle to emphasize to students. Over the years, I have seen various students with various tension issues. Having this concrete knowledge foundation, this self-representation, is the key to solve all issues that are related to back tension. That is why Thomas Mark's remark on balanced sitting is essential to emphasize.

The lumbar region of the spine is known to have the five biggest vertebrae, due to its responsibility for the weight-bearing of our head and the rest of the vertebrae. In Figure 9a and 9b/11, the student experienced two different sittings: In Figure 9a, the student threw her weight to the spinal cord in the thorax region; while in Figure 9b/11, the student centered her weight at the hip joint and lumbar region. In Figure 9b/11, the student had understood, after I explained the structure of our spine, (1) how our joints attach, (2) how long is our spine, and (3) how we move. I did this by showing her an anatomical model. After absorbing this knowledge, she was instantly able to change her sitting position from that of Figure 9a to that of Figure 9b/11. Note that her head, shoulder, lumbar and hip joints are now aligned in a straight line as her sitting position is in balance.

The third balance point is the arch of the pelvis (Figure 12). In both sitting and standing, the upper body-weight is delivered over the pelvis. When sitting, that weight is distributed to two sit bones; whereas when standing, the weight is distributed to the pelvis and outward to the two thigh bones. “The A.O. joint, shoulder joint, lumbar spine, and hip joint are aligned in balance over the sit bones” (Mark, 2003, p. 46). As you can observe in Figure 12, the hip joints are external to the pelvis, which is the reason why the weight delivery is not going into the tailbone. This anatomical image of the pelvis proves that weight-bearing does not go to the tailbone or to the two leg bones when one is sitting. It goes through the lumbar core and two sit bones to the piano bench. Understanding this function will allow the student to feel buoyantly balanced around his/her whole core.

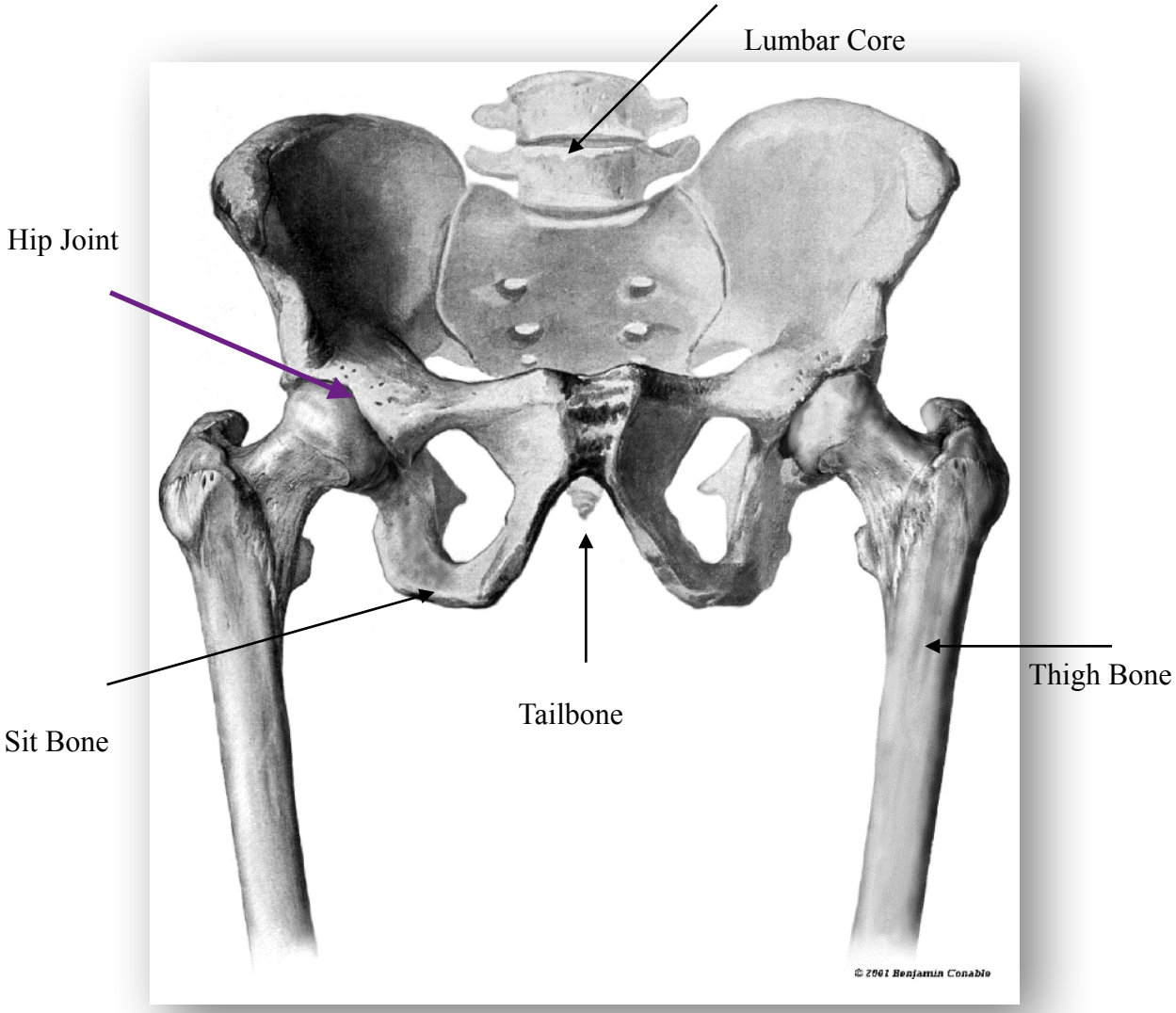

Figure 12: The Arch of The Pelvis (Conable, 2000, p. 27)

The fourth balance point concerns the hip joints. The hip joints are in the middle of the whole body, head to toe, not at the waist, as is commonly assumed. These joints mark the articulation of the head of the femur and the pelvis. It is the only true “ball and socket” (Mark, 2003, p. 34) joint in the body. When people arch their lumbar core, driving backward toward their lower backs, the patterns for compensation drag the hip joints forward. Notice that the hip joint are at the outside of the pelvis and that these joints are in and up from the bumps we feel at the bottom of our pants pockets. These bumps are called the greater trochanters and are on the lateral aspects of the femur. They are below and outside of the hip joints.

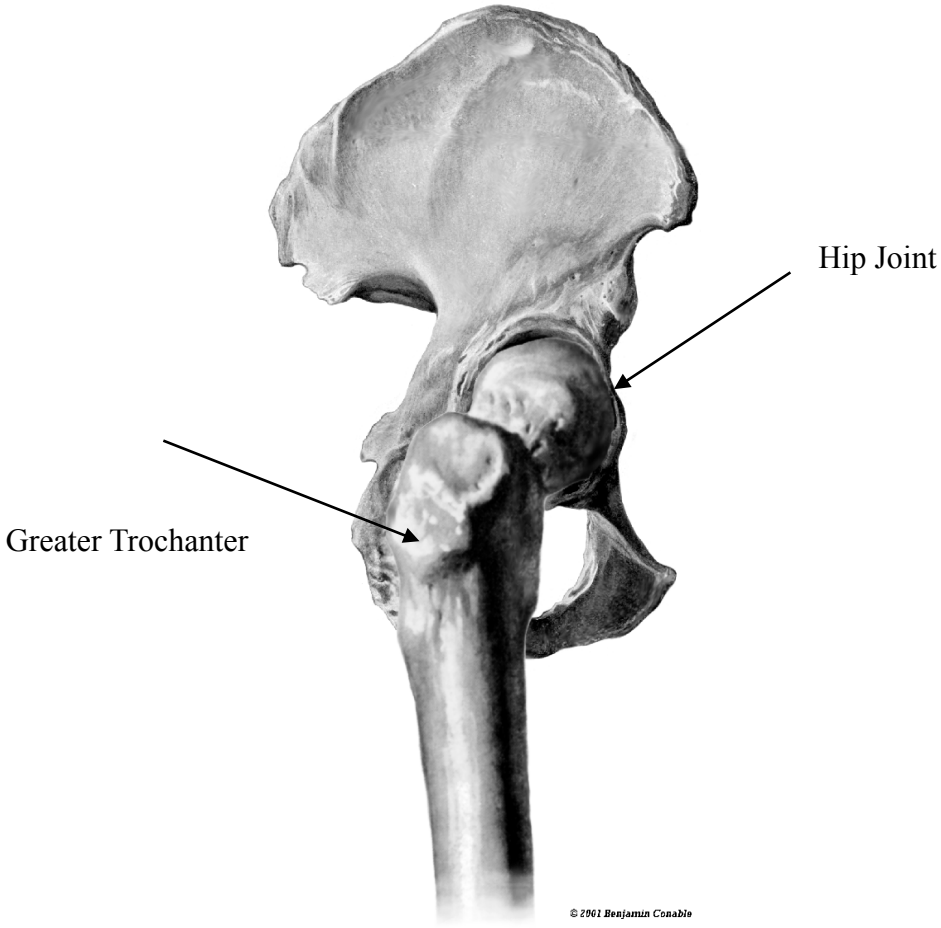

Figure 13: The Hip Joint
(Conable, 2000, p. 26)

Students should palpate the top of the thigh bones, insofar as they can. Then I would lead them in a bit of marching in place so that they can feel the thigh bones moving under their fingers because the hip joints are moving.

As Mark mentions, “Weight delivered to the bench through the sit bones leaves the hip joints free to move” (2003, p. 60). As pianists, we use our legs to employ the pedals. If we map the hip joints as the outer parts of our pelvis (at our sides just as we do with our ears), we will understand that the pelvis does not involve weight bearing and that our legs are able to move freely at the hip joints.

The fifth balance point is the arch of the foot. Our leg delivers weight (pressure) to our foot arch. Here, we have an ankle joint. It is where the lower leg meets the foot (Conable, 2000, p. 32). Our toes are not part of weight delivery. Students can check their weight delivery to the arch of the foot by how much freedom they still retain in their toes. Often, students will compensate by gripping their toes when their weight is thrown off balance. Over the years, I have noticed different types of piano pedaling from various students: pedaling from the whole leg that looks like stomping; pedaling from the toe and heel; and having improper knowledge of the “L” shape of the foot so that pedaling comes from the anterior parts of the ankle.

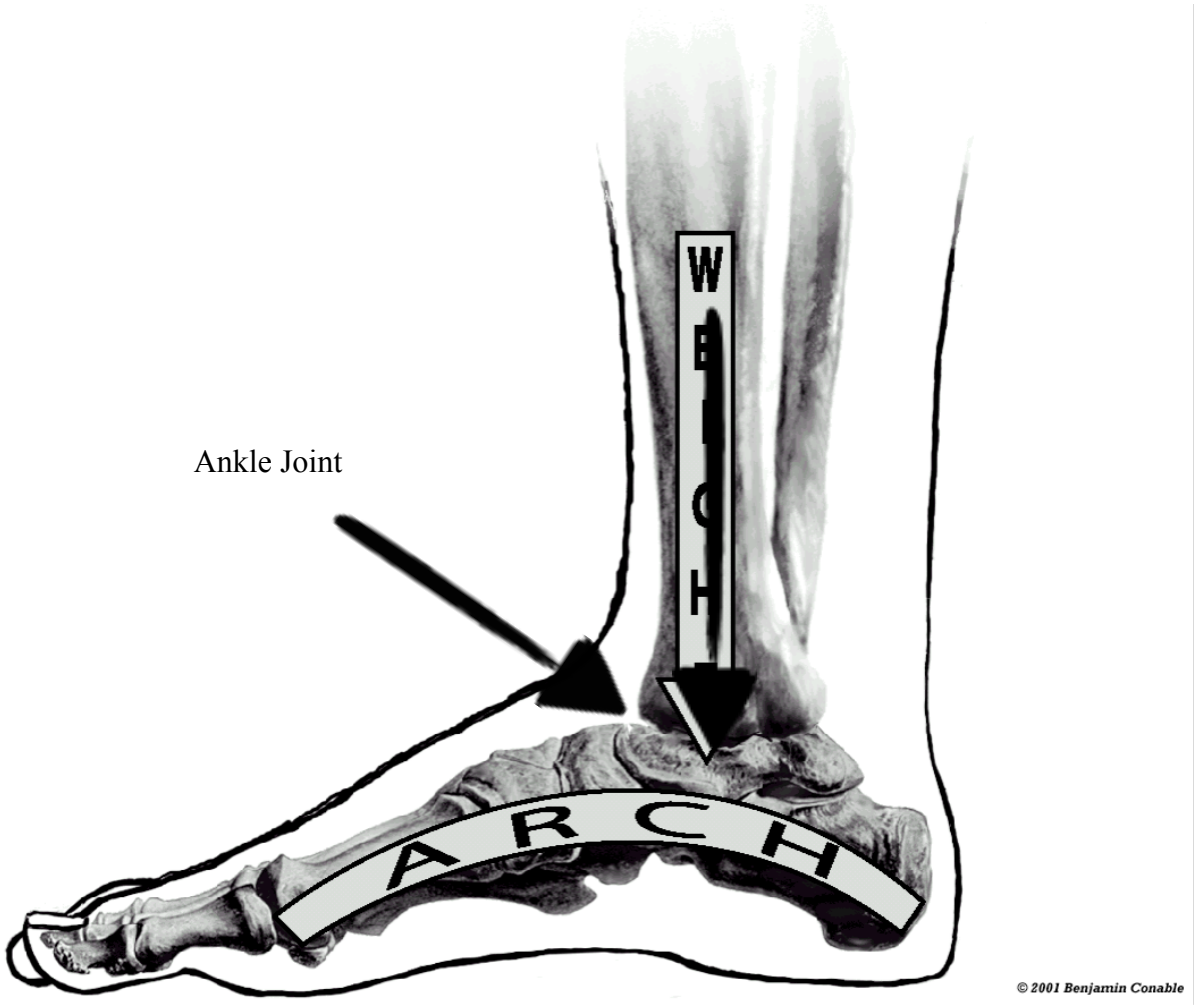

Figure 14: The Arch of the Foot (Conable, 2000, p. 33)

The correct way to use the pedals comes from the movement at the joint of the ankle and understanding that the heel can and must pivot. I tell my students, "Your heel needs to rest on the floor, but your movement occurs at the front of the heel (ankle joint) not at the back." Thus, students who understand the tripod shape (the arch) of the foot will have more control when using the pedals. After gaining this knowledge of the A.O. joint, spine, pelvis and arch of foot, students will have a more concrete understanding of how to sit at the piano in optimal balance.

The question now: How can we apply all this body knowledge to actual piano performance? We are in contact with three solid surfaces as we play the piano: (1) the bottom of the key bed when our fingers depress the keys, (2) the bench where our two sit bones rest, and (3) the floor where our feet are placed. The balance, which creates stability, comes from these three places. During my teaching, I ask students, "How do you keep your body balanced when you play the notes in the low register, middle register, and high register?" In Figure 15a, 15b, 17a and 17b, the left images are those that my students demonstrated for me. In Figure 15a, the image is of the student playing in the low register of the keyboard. Notice that the right side of her shoulder blade area is over-stretched and the left side of her body is cramped, meaning distorted**.** She is using only two solid surfaces, the bottom of the key bed and the bench. Her feet are on the floor, but she is not getting any support from the floor. After I captured the left image, we talked about the spine-torso relationship; and I guided her to move her left foot toward her hands since her body was moving down to the left register. She suddenly became aware that her feet on the floor were assisting her to move laterally, felt centered, and created a full sound without straining (see Figure 15b, the right-side image).

Figure 15a:
Awareness of Feet in Low Register (Before)

Figure 15b:
Awareness of Feet in Low Register (After)

In Dussek's Sonatina, Op. 20, No.1 (Figure 16), the right-hand notes begin in the middle of the piano register and move to the higher register.

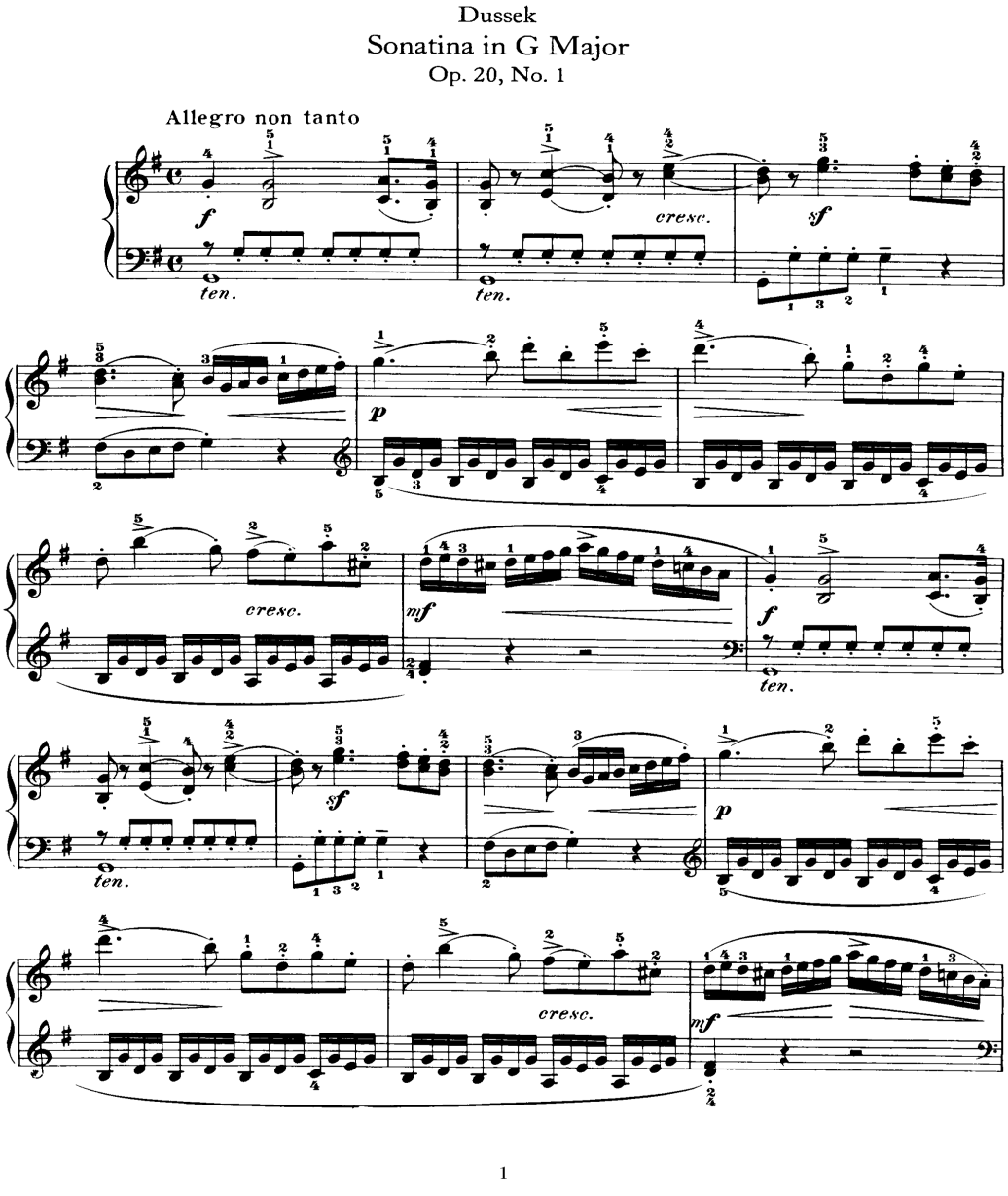

Figure 16: Dussek's Sonatina, Op. 20, No. 1

In Figure 17a, the student understood the concept of balanced sitting very well; however, he did not understand lateral movement. The spine, torso and arms can move laterally along the keyboard to give both support and strength as the notes move up to the high register. Once the student gains awareness of his feet on the floor along with the previously explained concepts, he can quickly change his position to match the right side of the image (Figure 17b).

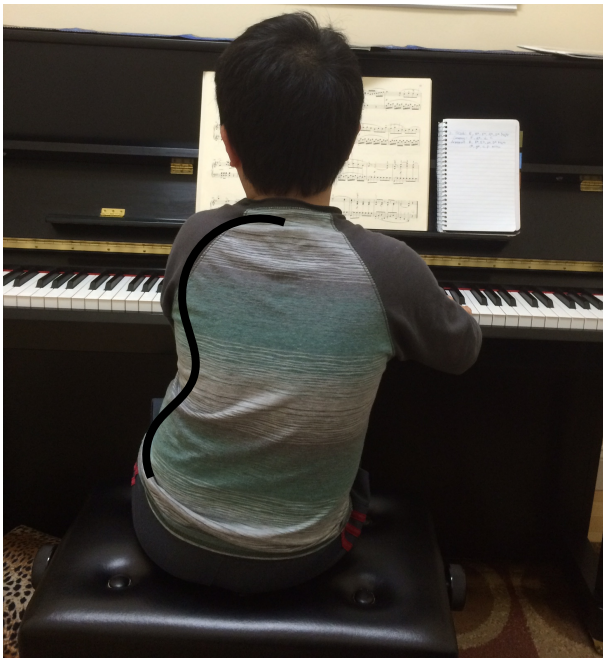

Figure 17a: Awareness of Feet in High Register
(Before: Distorted)

Figure 17b: Awareness of Feet in High Register
(After: More in Alignment)

Pianists need to strive for balanced sitting at all times while on the bench. They spend the majority of their time sitting, due to the mechanics of the instrument. This is why finding and maintaining balance while sitting is essential for tension-free piano playing. To keep this balance when sitting, students must understand the relationship between the A.O. joint, spine, pelvis, and foot as well as realizing that the spine, torso, and arms can all move laterally along the keyboard as one changes registers on the keyboard. Lastly, they should know the relationship between these four balance points in playing by synchronizing them. Concert pianist and music professor Robin McCabe states,

"Every teacher must watch over their students' body movement. It is irresponsible to ignore body movement and physical tendencies when teaching" (face-to-face, 2015).

Chapter Four

The Whole Arm and The Shoulders

Pianists need to value their body and to take good care of their physical well-being, including taking care of their arms. Free arms are a necessity in playing the piano with ease. Specifically, we use fingers on the keyboard to produce sound. But because the fingers are connected to the arm, it is advantageous to know the structure of the entire arm in order to understand the function of the fingers. While a person uses the kinesthetic sense to diagnose and respond to the condition of his/her muscles, it is also beneficial for the person to determine the origin of the movement. With the kinesthetic sense, we can do this; however, we cannot improve unless we understand the anatomical part of the body that is involved. Knowledge of arm structure and function enables pianists to feel the arms' movements more easily, to diagnose arm issues, and to understand how to respond to them.

The arm (Figure 18) includes the collarbone (clavicle), shoulder blade (scapula), upper arm (humerus), two lower arm bones (radius and ulna), wrist (carpal bones), hand (metacarpals), and fingers (phalanges). "The movement of the collarbone and the shoulder blade occurs at the sterno-clavicular joint" (Mark, 2003, p. 65). A ligament is what connects the collarbone and the shoulder blade. This joint is also the only place where the arm bone is attached to the body. The collarbone and shoulder blade are attached as well to the breastbone at the sterno-clavicular joint. As a result, the shoulder blade will move as the collar bone moves. As you visualize this structure, you know the shoulder is not at the tip of the collarbone; the shoulder includes both the collarbone and the shoulder blade.

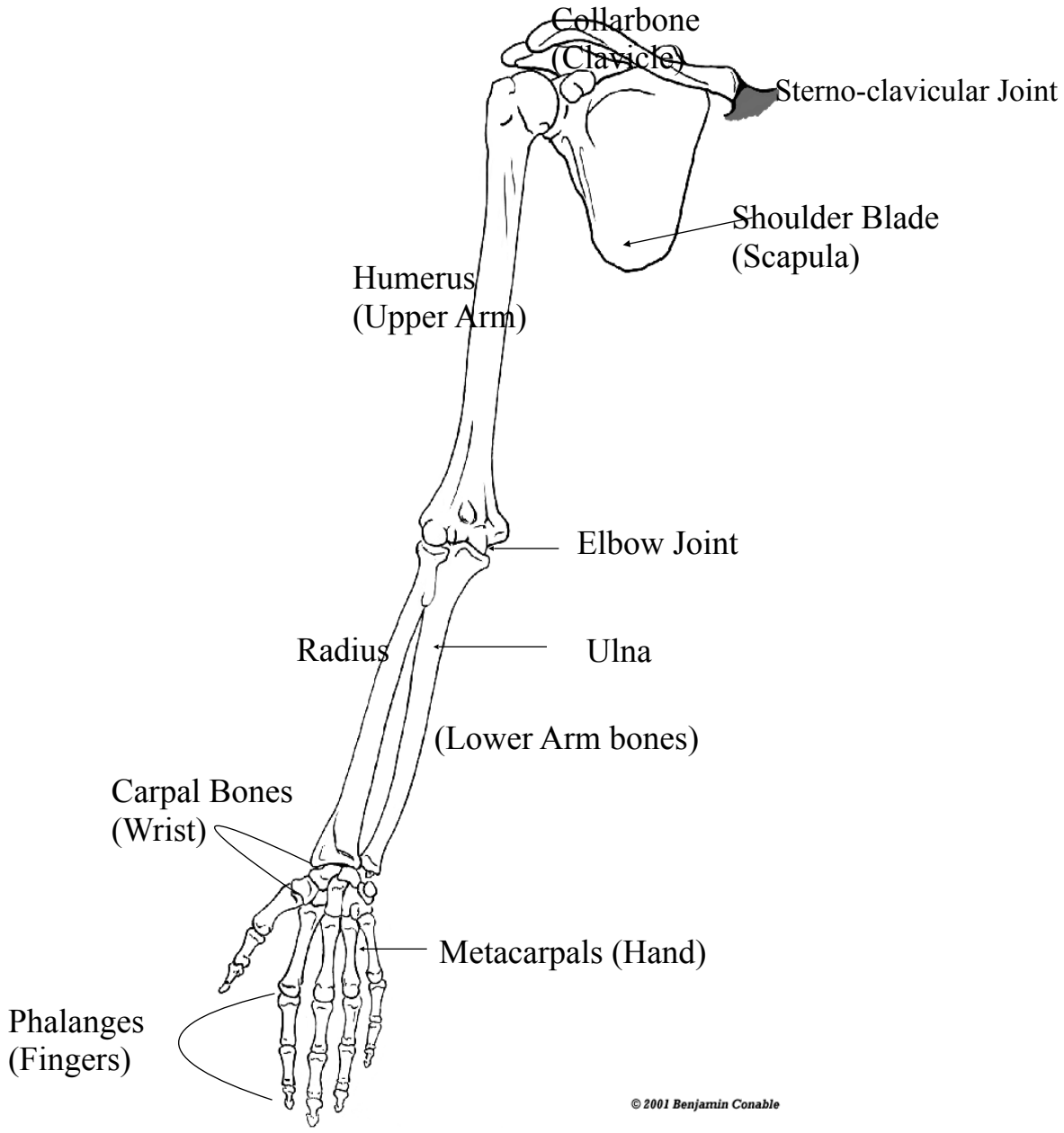

Figure 18: The Whole Arm (Conable, 2000, p. 50)

The humerus meets the ulna and the radius at the elbow joint (Figure 18). The elbow joint permits bending/unbending and pronating/supinating (turning the palm down and the palm up). The two bones in the forearm are called the ulna and the radius. The ulna is located on the little finger side of the arm; the radius is on the thumb side. The ulna stabilizes, while the radius moves across (Figure 19). It is vital to know from where the rotation of the forearm is coming. One can compare the movement organized around the ulna and the little finger to the movement organized around the radius and the thumb, because the ulna is the stabilizing bone. Visualizing the forearm as stabilized by the radius will likely cause ulna deviation, which limits freedom of motion of the wrist (Mark, 2003, p. 80).

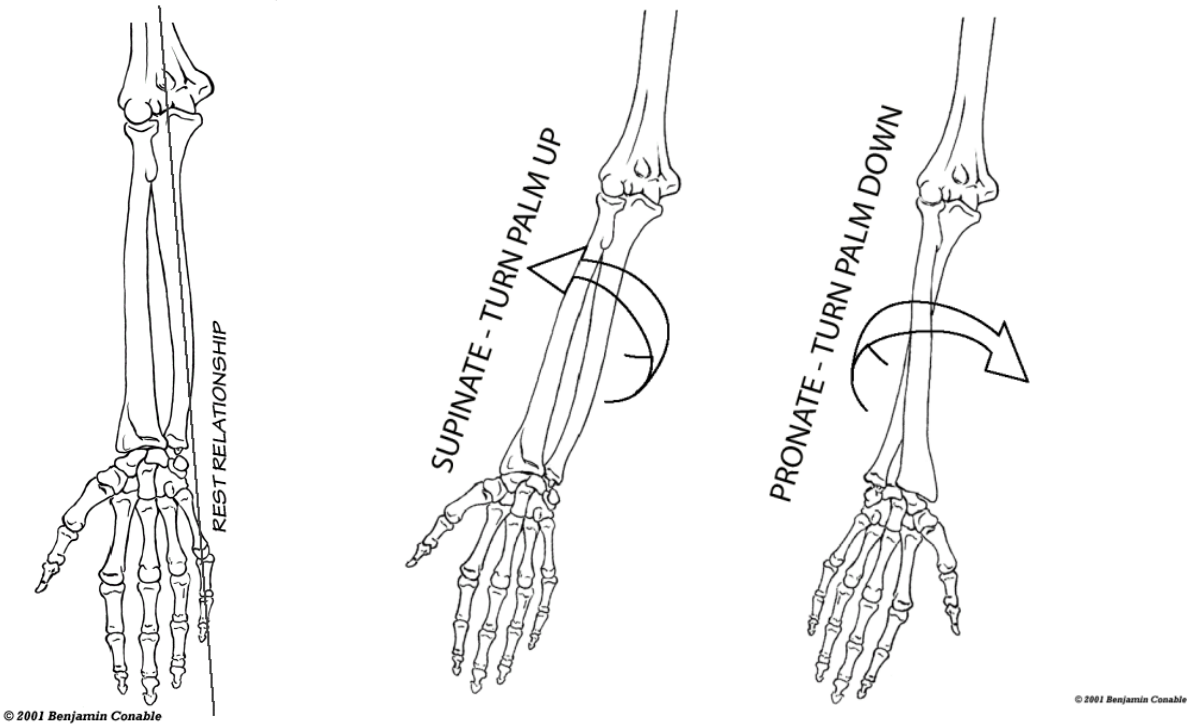

Figure 19: Rest Relationship: The Radius Crosses the Ulna (Conable, 2000, pp. 58,62)

As described, it is essential to understand the correct “map” of the entire arm and the movement of the shoulder blade, the collarbone and the forearm. These components of the whole arm are inextricably linked to each other. If one part is not in its correct place, the other components of the structure will naturally go wrong, just as tipping one block in a line of blocks will cause the other blocks naturally to fall down. The radius meets the wrist bones at the first joint. The wrist is made up of eight bones oriented in two rows of four bones each. The wrist has three joints (Figure 20). The first joint is where the arm bone (radius) connects with the first row of the wrist bones; the second joint is where first wrist bone connects with the second row of the wrist bones; and the third joint is where the second row of the wrist bones connects with the finger bones (hand).

During my teaching, I have experienced two ways in which students use their arms. In one way, the student orients his or her arm by the thumb side; the other way, the student orients his or her arm by the little finger side. Aligning the thumb with the radius as in the first type, will eventually cause ulna deviation. Mark writes in this regard, “The sideways movement of the hand toward the little finger is called ulnar deviation, because the hand bends toward the ulna” (p. 85). The student who deviates the ulna will place the wrist in a twisted and compressed state. Since the wrist is connected to the forearm, this will cause forearm tension.

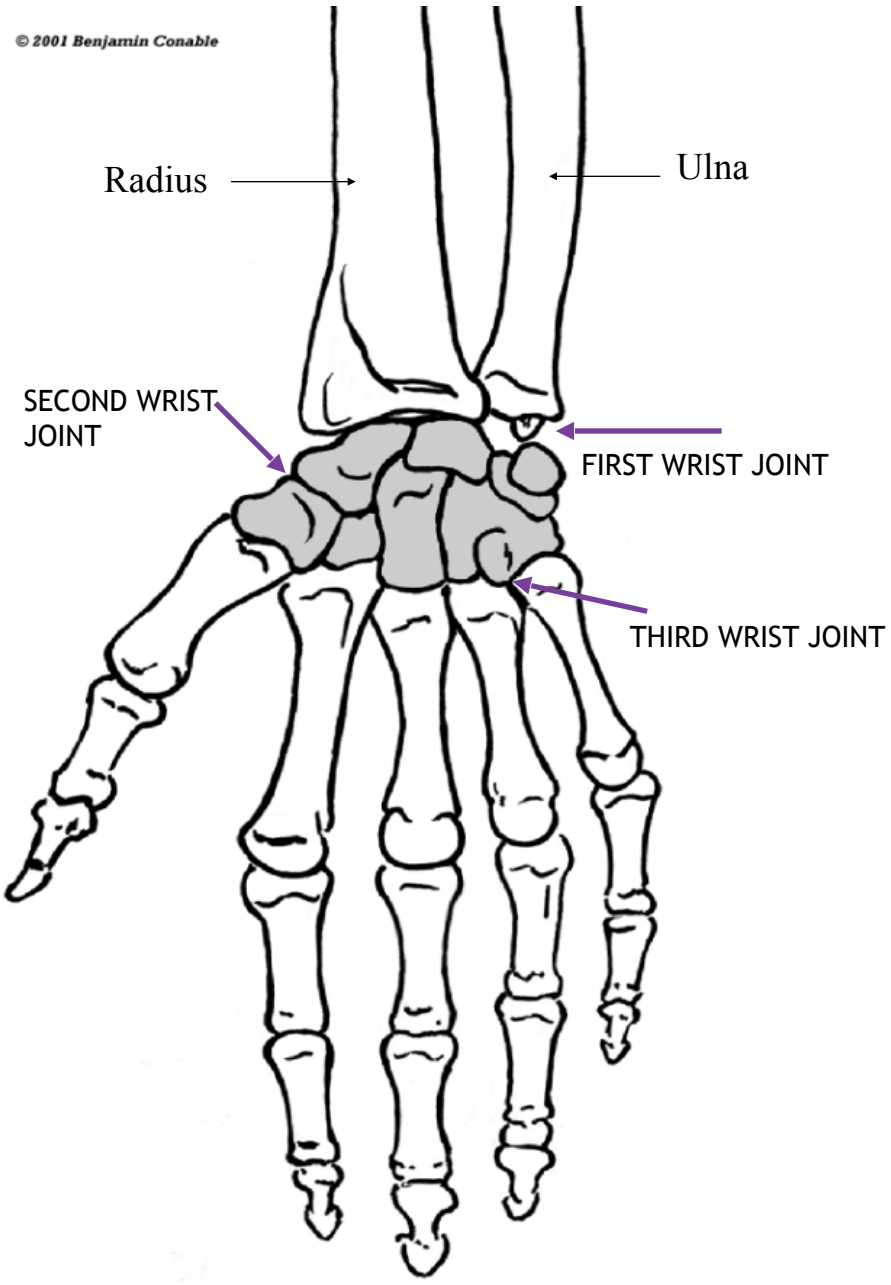

Figure 20: The Wrist and The Hand (Conable, 2000, p. 64)

There are many keyboard repertoires, each of which requires different piano techniques. It is incorrect to use one technique to play every piece. Consequently, each pianist must know which is the correct map of his or her body for each piece. The correct internal self-representation of each pianist's body structure and the size and the function of his or her body will prevent

the pianist from creating unnecessary tension. Thus, there is a balance level that each pianist needs to find. Exceeding the balance level of ulna deviation creates a high chance of feeling a stiff wrist, thumb pain or swelling; and it can also lead to carpal tunnel syndrome. Marsh states, "Carpal tunnel syndrome is another common injury reported by pianists. It refers to a combination of symptoms that occur when the median nerve is compressed in the carpal tunnel. These symptoms include numbness and tingling in the thumb, index and long fingers and wrist pain" (2012, p. 101).

The carpal tunnel is underneath the wrist. The median nerve and several tendons pass through the carpel tunnel (Marsh, 2012, p. 144). A compressed, twisted wrist will restrict the flow of the carpal tunnel and can ultimately cause damage. Contrary to the thumb orientation, if the pianist lines up with the little finger side, this will permit the natural rest relationship between the arm and the wrist to create a long and flexible wrist (Figure 21a).

Figure 21a: Natural-Rest Relationship

Figure 21b: Thumb-Orientated Hand

Flexibility at the wrist joint can help the pianist create a beautiful singing tone. Without having pliancy at the wrist joint, one cannot produce a singing tone. One misconception about the wrist is that it is hinged at the watch band. Those who believe this will have a very hard time creating a long legato sound while playing the piano. Employing all the possible wrist movements will make it easier to produce a singing tone.

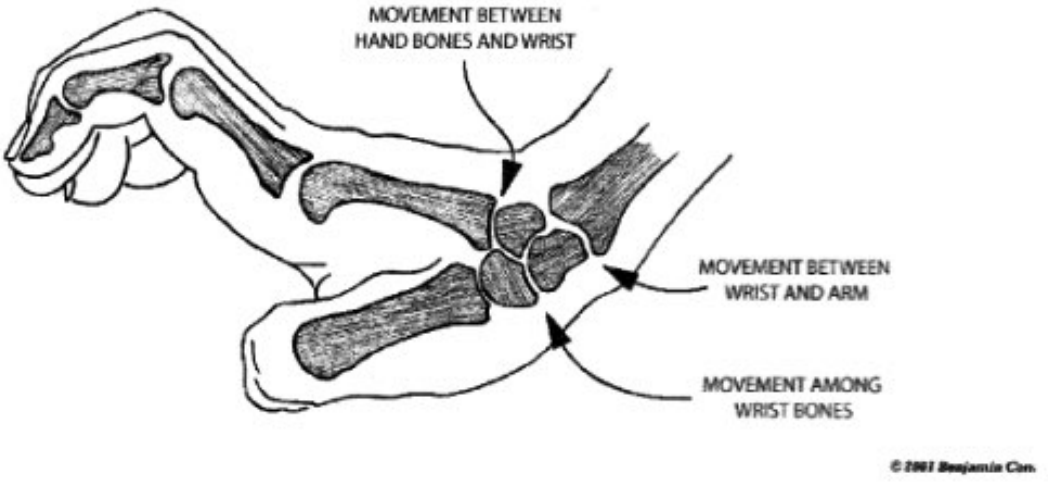

Figure 22: Movements from Three Wrist Joints (Conable, 2000, p. 65)

Robert Schumann's “Melody" from *Album for the Young,* Op. 68, opens with a two-measure slurred passage in both hands (Figure 23). Both this piece and Grieg’s “Arietta” from *Lyric Pieces*, Op. 12 (Figure 24) require a long and connected sound. To obtain beautiful tone and sound, the pianist must have a flexible wrist.

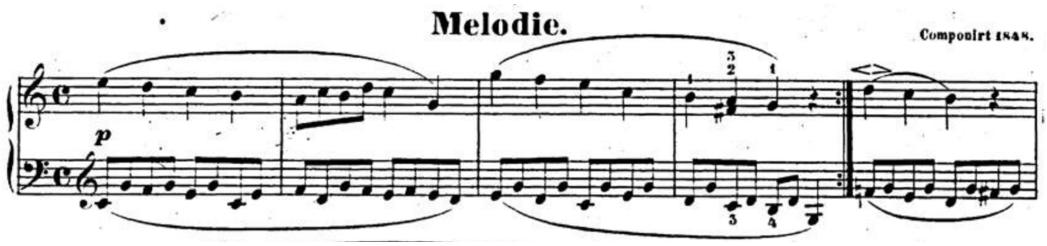

Figure 23: Schumann's "Melody" from Op. 68

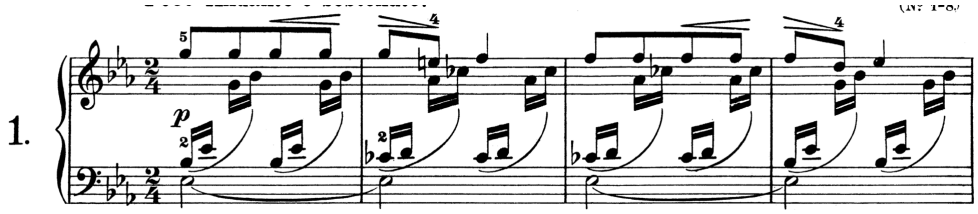

Figure 24: Grieg's "Arietta" from Op. 12

Let us explore two types of stretching, in two different situations involving the wrist. Pretend that you are thumb-orientated, meaning that your thumb lines up with your forearm bone. Try to stretch between your thumb and your fifth finger by imagining that you are opening your hand from your knuckles. Now, let's pretend that you are little-finger-orientated, meaning that your little finger is in a "rest" relationship with your forearm and maintains a natural hand shape (refer to Figure 21a). Try to open your hand by using your metacarpals where each finger bone meets the wrist bone (refer to Figure 20). If your hand is not in a natural rest relationship, you will twist and compress your wrist bone; and the stretches for an octave or 9ths will be adversely affected. I have worked on pieces by several Russian composers that require a fairly large hand. Their compositions include musical elements of the chord, octaves, and 9ths. For example, in Alexander Scriabin's Etude, Op. 65, No. 1 (Figure 25), the right hand requires double-

notes of 9ths, and the left hand requires double-notes of 7ths. Because the right hand has a passage of consecutive 9ths, pianists with small hands need to open the right hand by using the carpo-metacarpal joints (where the finger bones meet the wrist bone). If the pianist restricts the stretch due to an ulna deviation, it will be difficult to achieve the 9th stretch. In this etude, the pianist can practice and feel the movement from the sterno-clavicular joint, especially in the left hand, when he/she is playing the double 7th notes and passing to bigger intervals. For the passage with a broken chord with big leaps, he/she feels the movement at the shoulder joint. In truth, pianists with small hands would do well to avoid this piece.

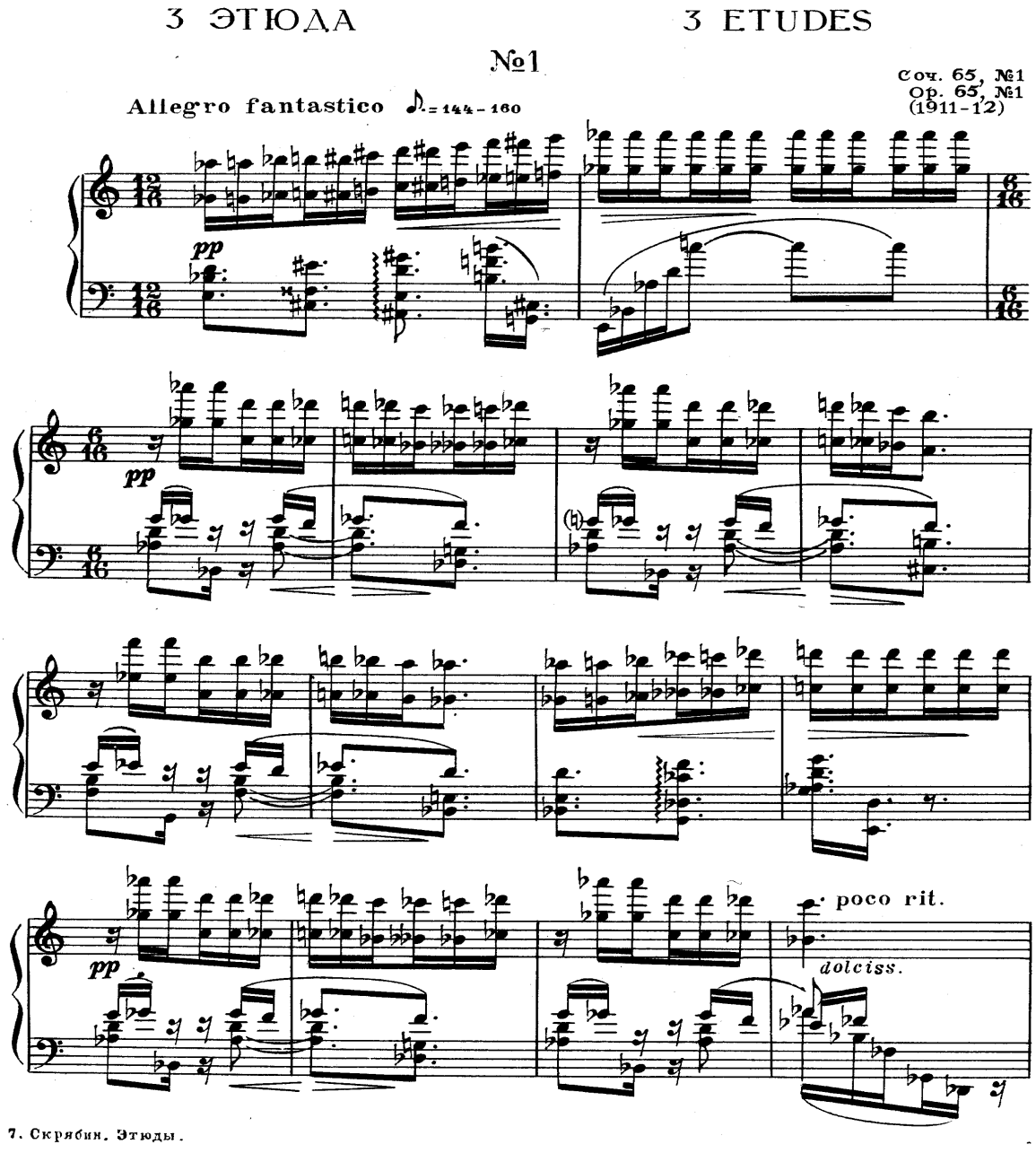

Figure 25: Scriabin Etude, Op. 65, No. 1

Another Russian composer, Sergey Rachmaninoff, in Op. 43, Var. 8, includes various chord patterns and octaves. “In playing this piece, the hand is always opening or closing—never set” (McCabe, face-to-face, 2014). One can strain and create more work for the hands by setting a fixed position in advance.

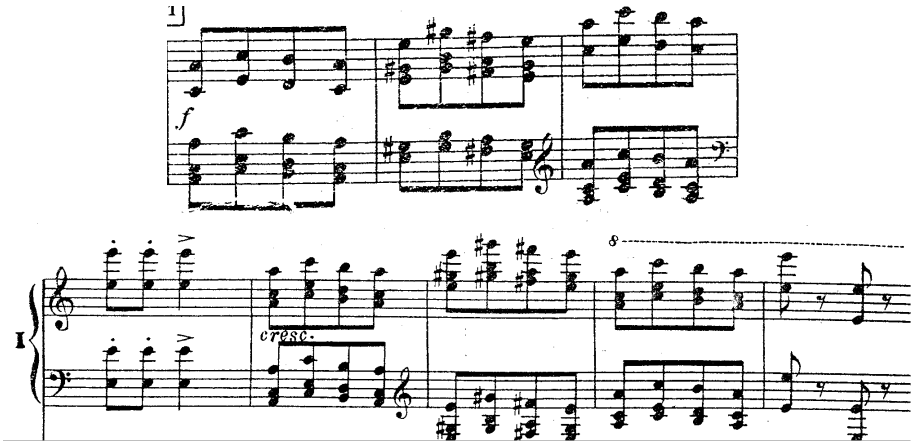

Figure 26: Rachmaninoff *Rhapsody on a Theme of Paganini*, Op. 43, Var. 8

The concepts of “stable” and “fixed” can be seen as in a similar category, but they have different meanings. "Stable" means that one’s body rests in a balanced and buoyant state. "Fixed" means that one’s posture or position is immovable, as if frozen. When a pianist fixes even one joint in his/her body, all the other joints try harder to accommodate the resulting loss. As I discussed previously, it is crucial to keep one’s body stable, but not rigid or set. Pianists must have correct internal representations of structure, size and movement of their whole arm

and allow for movements of the fingers, elbows, upper arms, shoulder blades, and the collar bones in their playing.

During my teaching, there have been two groups of students who display two different movements of the shoulder: first are students with the correct internal representation of their shoulder blades; second are students who have an incorrect internal representation of their shoulder blades. When students have an incorrect internal representation, they visualize their shoulders to be at the side tip of the collarbone. If this were true, the back of the shoulder blade would be ignored and would stiffen. If students have not experienced the movement of the shoulder blade, and they are not aware of the structure of the whole arm, which includes both the shoulders and also the shoulder blades, they can do the following shoulder blade exercise to feel the full range of its motions. For this exercise, have each student pair with a partner. Ask the partner to put his or her hands on the student's shoulders and shoulder blades, and then move his/her shoulder blades up and down (up: move in a circle by moving the shoulder up to the side of his/her ears, and then down), and back and forward (back: try to feel if the shoulder blades can touch each other; forward: give him/herself a big hug). It is important for pianists to know how to do this so that they can access full-range motion of the whole arm in musical passages which require playing big chordal leaps (Figure 27).

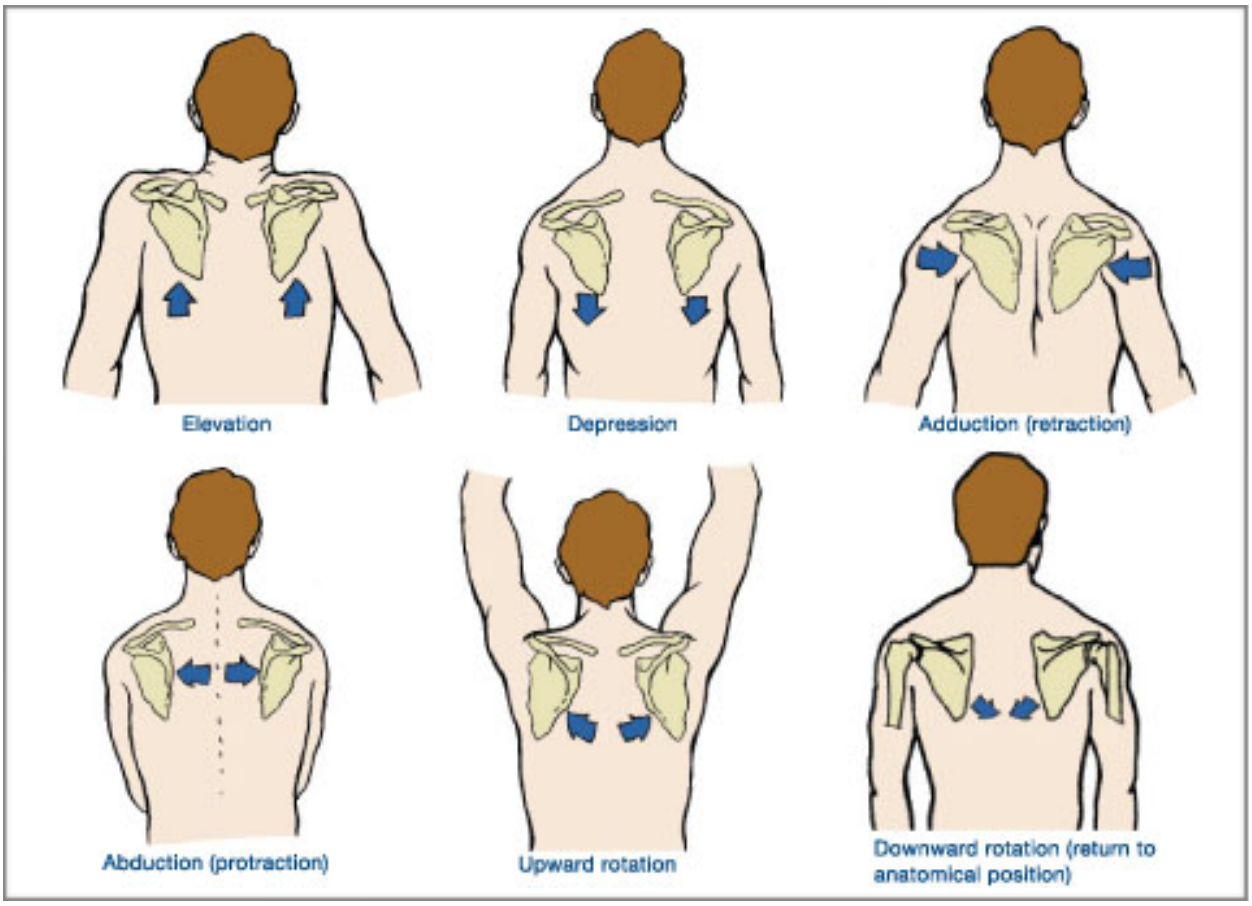

Figure 27: Shoulder Exercise (Retrieved December 5, 2014, from http://best-performancegroup.com/?page_id=966)

If the proper muscle is not working and some other muscle is activated, then the compensating muscle must work two to three times harder (Liu, Maitland, and Bell, 2000, pp. 294-301). Thus, the alternative muscles are going to become more fatigued. On the other hand, sometimes micro (small) movements of the shoulder blades and the collarbones are essential for playing certain compositions.

The shoulder joint is where the humerus (upper arm bone) meets the shoulder blade socket:

> The ball at the end of the humerus articulates with a small, basin-shaped surface that forms the outer end of the shoulder blade. The surface of the socket is small, only about the size of a thumb print, and it does not surround the ball of the humerus or constrict its movement. A capsule of ligaments holds the ball of the humerus in position against the socket; these ligaments are flexible enough to permit an exceptionally wide range of motion. As the humerus moves, the ball turns in different ways and different parts of its surface comes in contact with the socket (Mark, 2003, p. 34).

This is why the shoulder joint remains the most mobile joint in the human body.

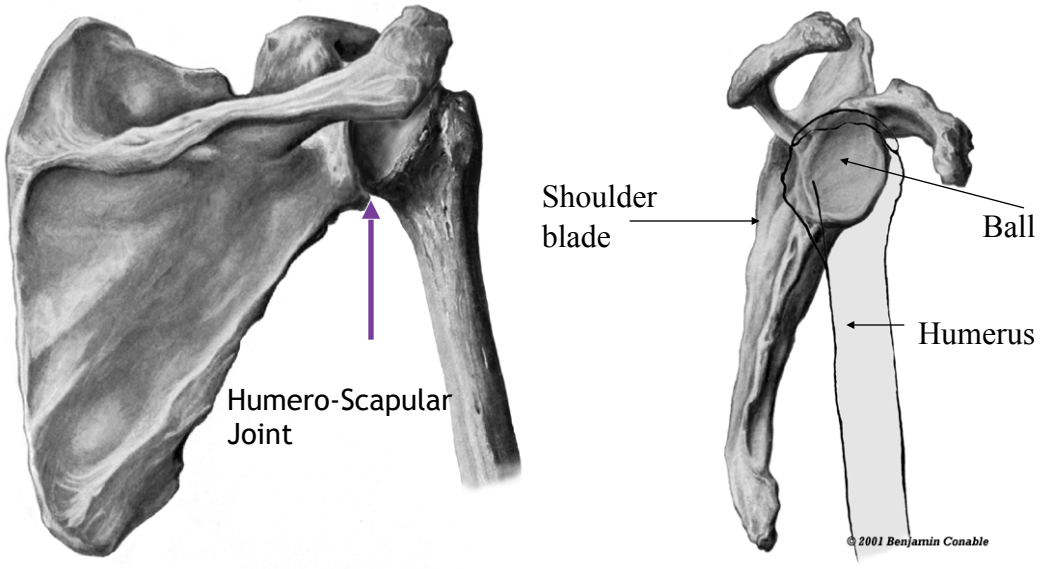

Figure 28: The Humero-Scapular Joint (Shoulder Joint) (Conable, 2000, p. 55)

At the shoulder joint, one can experience the rhythm of scapula movement, known as the humero-scapular rhythm. The shoulder blade has a built-in tendency to move in a particular sequence with the humerus. As the humerus moves a certain distance, the collarbone and the shoulder blade fit in and begin to move in the same direction. When moving the upper arm bone upward to its natural limit, the movement will sweep to the sterno-clavicular joint, and the collarbone will rise. This motion is known as the "swimming motion." You can experience the humero-scapular rhythm by moving your arms in a swimming motion and observing that the humero-scapular rhythm is clearly present in a natural and fluid way.

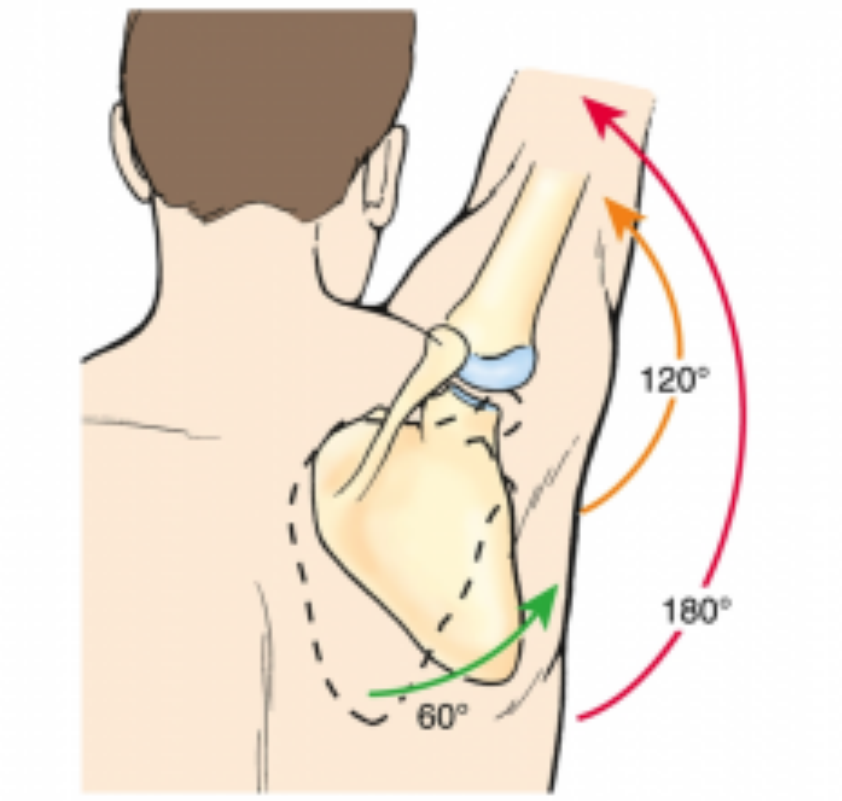

Figure 29: The Humero-Scapular Rhythm[1]

[1] [Untitled illustration of a Humero-Scapular Rhythm]. Retrieved December 5, 2014 from http://bestperformancegroup.com/?page_id=966

Pianists use the shoulder joint when the shoulder blade and collarbone move in their natural movements, up and down, forward and inward. This use of the shoulder joint can be easily seen in piano literature. For example, it is easier to use the shoulder joint in a passage requiring skips when combined with chords and with the in-and-out movement of the black key area (Figure 30, 31, 32).

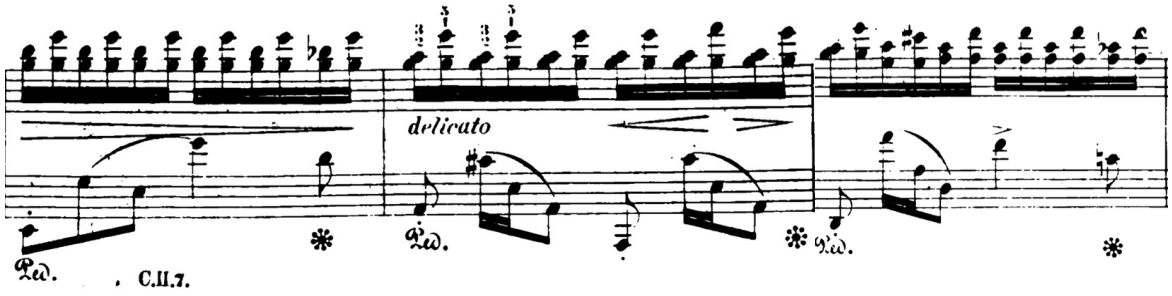

Figure 30: Chopin's Etude in C Major, Op. 10, No. 7 (In & Out movement)

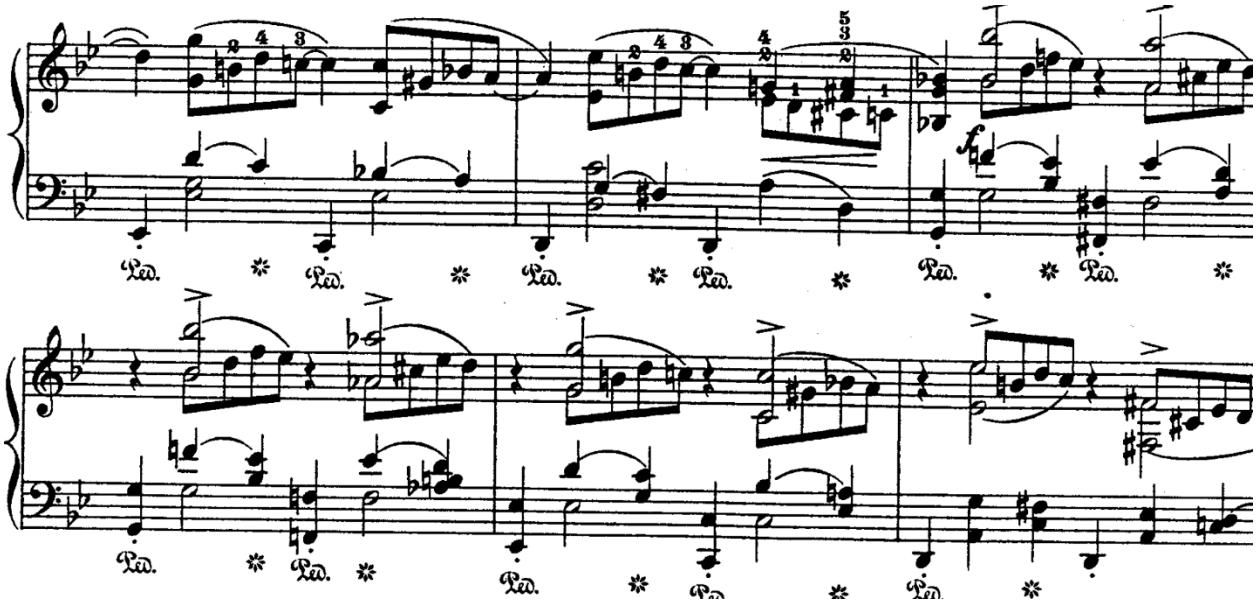

Figure 31: Chopin Ballade, Op. 23, No. 1 (Left Hand Large Leaps)

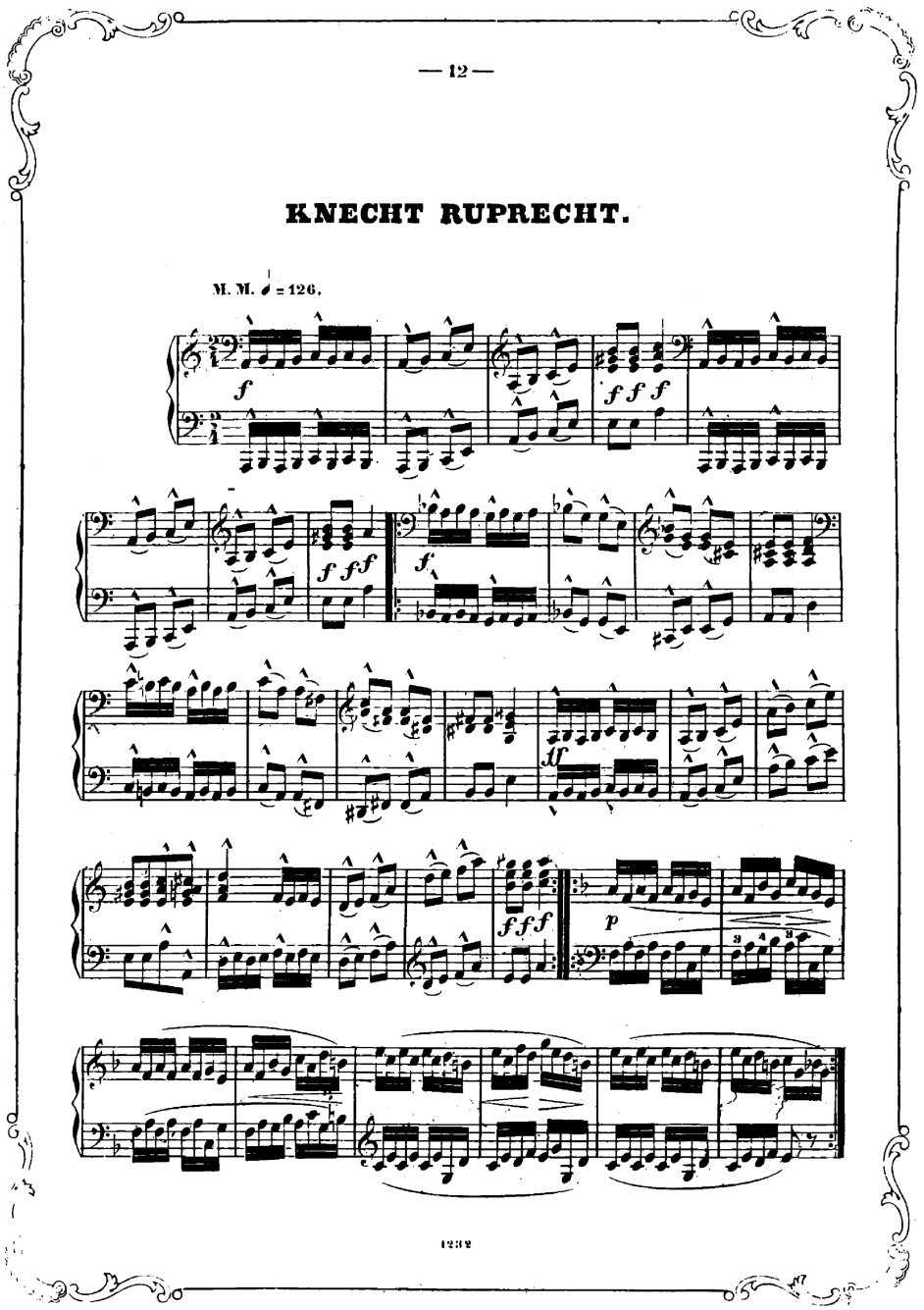

Figure 32: Schumann's "Knight Rupert," Op. 68, No. 12; Large Leaps on both hands and (In & Out) movement in the middle section

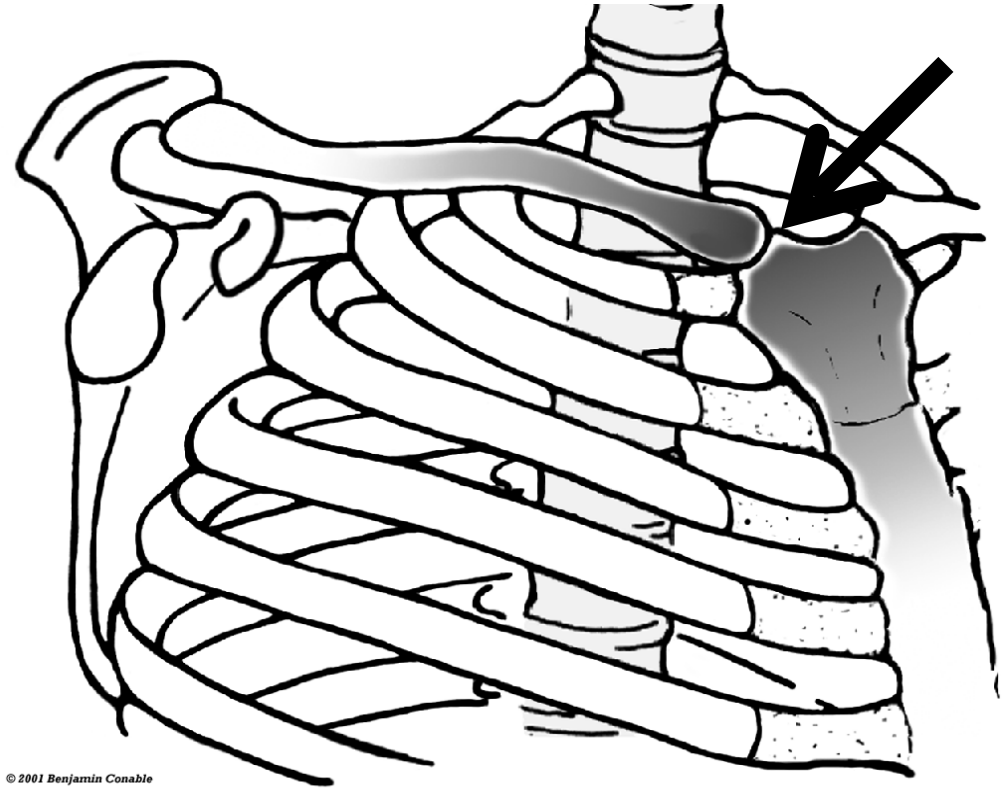

Figure 33: The Sternoclavicular Joint (Conable, 2000, p. 52)

The sterno-clavicular joint (Figure 33) permits three movements: up and down, forward and back, and rotation. Pianists need micro (small) rotation movement at the sterno-clavicular joint especially when crossing hands or reaching in front of the body.

A musical example of rotation movement at the sterno-clavicular joint occurs when playing an excerpt from Scarlatti's Sonata K. 95 (Figure 34). The right hand melody requires constant hand-crossing in front of the body. It is important when playing the hand-crossing passage to lead the movement from your arm, not from your fingers. Try to give yourself a big hug and feel

the shoulder blade and collarbone movement. When you access the full range of movement while crossing your arms, playing a crossed-hand piece will become easier. For this reason, you must understand how best to move at the sterno-clavicular joint. Otherwise, this piece will be very tiring to play.

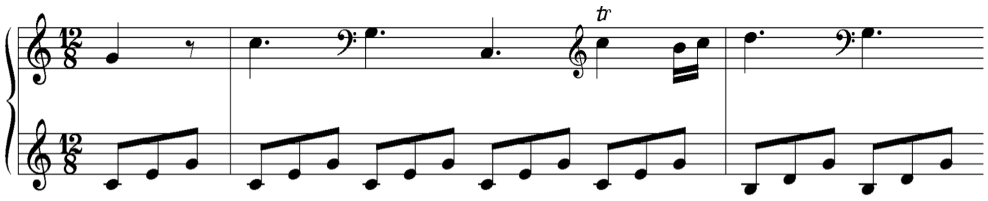

Figure 34: Scarlatti Sonata in C Major, K. 95

There are several ways to restrict the movement at the sterno-clavicular joint. When one pulls the shoulder and collarbone down, movement will be restricted at the sterno-clavicular joint. Pulling down is not relaxing: sometimes students think relaxation and feeling balance involve forcing the shoulder as far down possible, which is definitely harmful. If one keeps trying to put the shoulders down but does not have any cushion by which to go down further, the result is that the pressure can cause limited access of the blood vessels and nerve systems underneath the arm. This will create numbness or lost blood circulation of the arms and fingers (Figure 35) (Goldberg, n.d., p. 27). Understanding this knowledge, students will avoid pressing the shoulders down too far.

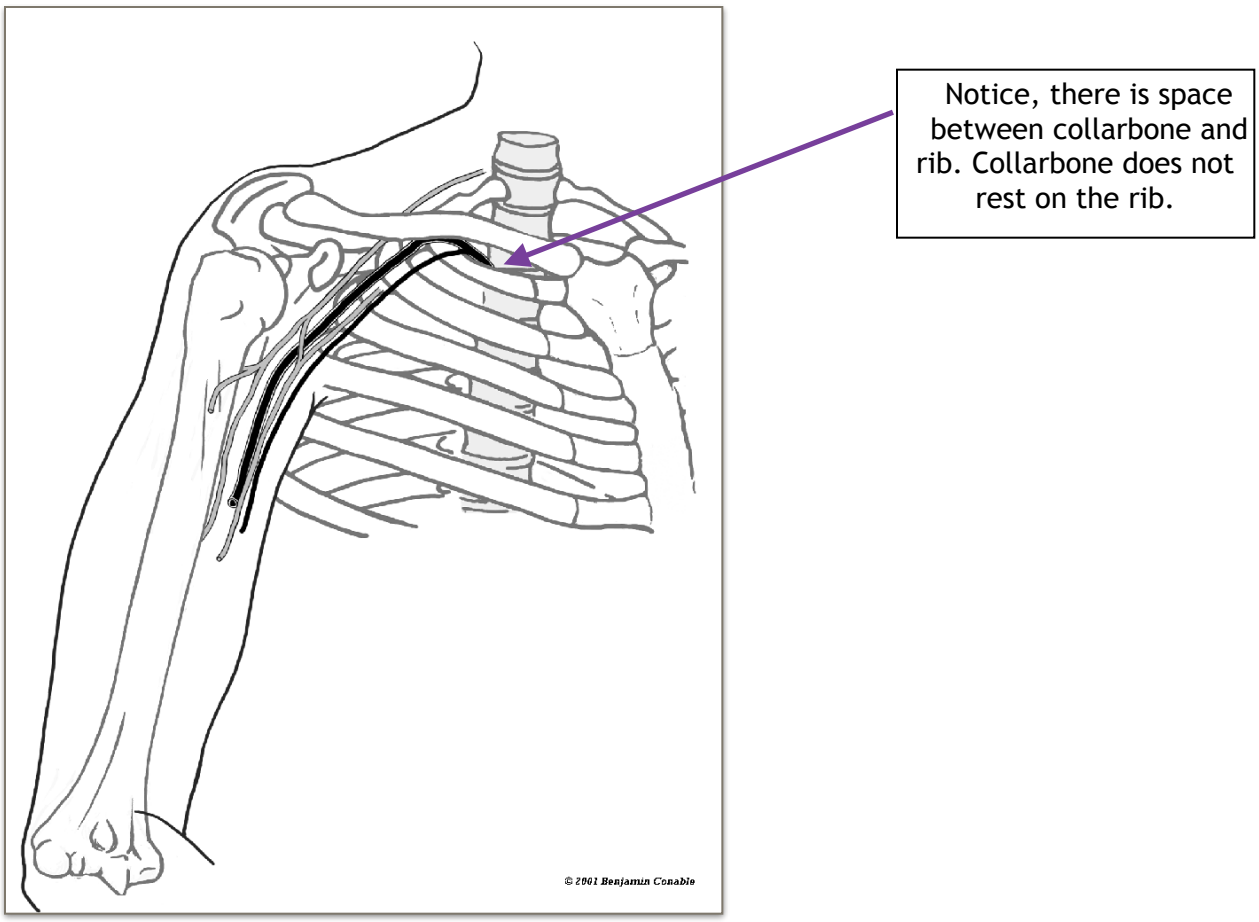

Figure 35: Collarbone Is Not Resting On the Rib (Conable, 2000, p. 70)

Movement at the sterno-clavicular joint can also be affected by the trapezius muscle. In the *Fundamental Principles of Coordinate Movement for Pianists*, which she wrote in 2012, Lisa Marsh comments on the importance of muscular facts:

> The trapezius muscle, that trapezoid shaped muscle which begins in your neck and continues across your back, will become tight if there is not enough movement at the first arm joint. This is caused by holding the muscle still or trying to move just from the shoulder due to incorrect body map of the whole arm. From Alexander's principles, we know tension in the neck is hazardous (p.17).

The human body is marvelous; its parts are all miraculously linked. As mentioned previously, the trapezius muscle is closely connected with the surrounding muscle systems. The neck muscles and shoulder muscles are all connected to each other. Without freeing your neck tension, you cannot free your shoulder muscles or shoulder movement. Hence, micro-movement at the sterno-clavicular joints is essential to avoid unnecessary pressure in the back, shoulder, and neck and to be free of tension when playing the piano.

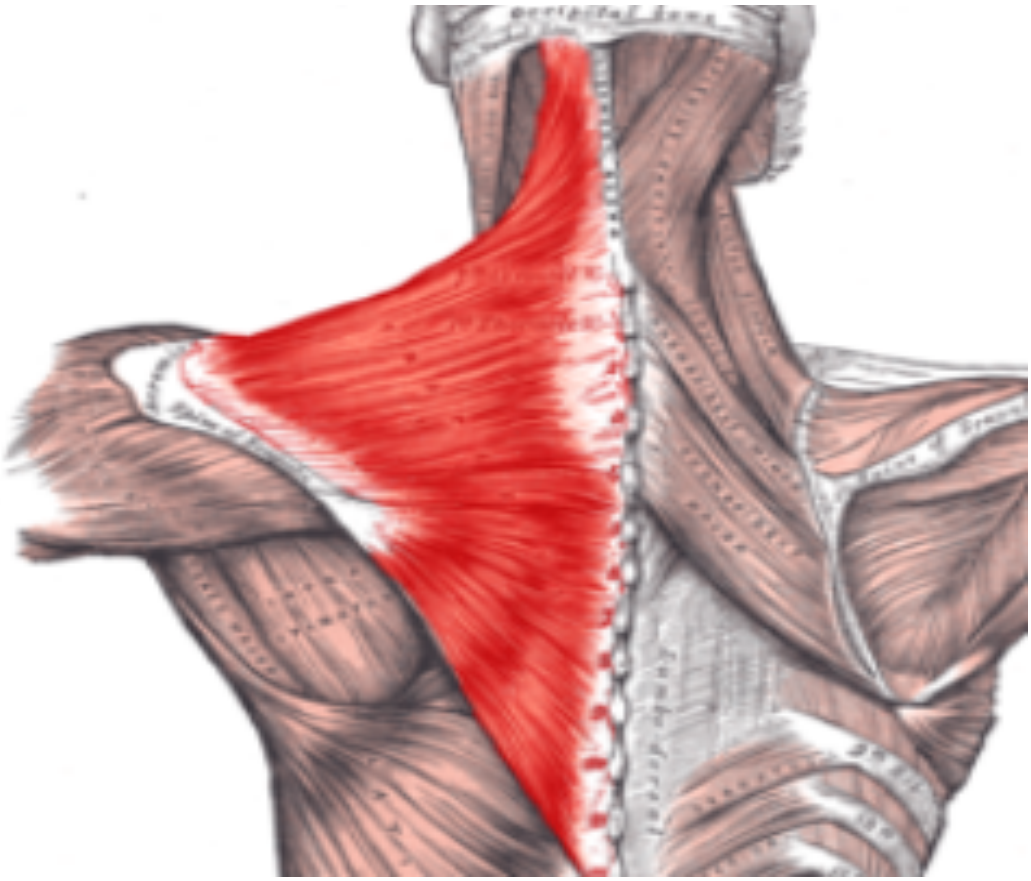

Figure 36: The Trapezius Muscle (Häggström, 2014, Retrieved December 5, 2014, from *http://commons.wikimedia.org/wiki/File:Trapezius_Gray409.PNG*)

Chapter Five

Body Mapping and Piano Technique

For the pianist, complete technique involves optimal sensory awareness, finding optimal sitting balance, and gaining knowledge of the entire structure and function of the arm and shoulders. In this chapter, I will discuss the four most-practiced piano techniques that I have observed in teaching young students over the years. The musical examples that are shown here are all empirical. First, I will write about the issues that I have diagnosed in students; second, I will illustrate the process of solving these difficulties. Finally, I will discuss how the technical difficulties have eased in terms of execution and control of tone and volume.

Prior to mentioning the most-practiced piano techniques, I need to address two major issues. First, I have observed that one hundred percent of my students mis-mapped their thumb length. They all believe that the thumb begins at the knuckle near the palm. As you see in Figure 37, the length of the thumb is quite long; it begins near the wrist joint. In order to feel effortless forearm rotation for the thumb, it is vital to correct internal self-representation of the whole thumb. After students correct their body map, I ask them to play the thumb: (1) by itself, (2) by straightly dropping it to the keyboard, and (3) with forearm rotation. Those who play the thumb with forearm rotation are all astonished because of easiness of the movement and the ringing tone quality.

Second, most of the students believe that their fifth finger is the weak finger. If the students are trying to play the fifth finger only by itself, it is going to be very weak. But, if they play the

fifth finger with rotation by using the second arm joint (refer to Figure 28) and humero-scapular rhythm, they are always surprised by the volume of the sound that they create. In order to feel the first finger to fifth finger rotation comfortably, the students need to understand the thumb and fifth finger anatomically and the forearm rotation that happens at the elbow joint.

Figure 37: Anatomy of the Hand[1]

[1] [Untitled illustration of anatomy of the hand]. Retrieved December 5, 2014 from http://www.orthopedics.stanthonyshouston.com/anatomy-hand-wrist.html

Rotation

We have multiple piano repertoires that require rotation technique. The pianist Tobias Matthay strongly emphasizes the importance of rotation in piano playing because he believes that rotation technique is indispensable:

Reginald Gerig discusses Matthay in his *Famous Pianists & Their Technique* (2007, p. 391): Perhaps the best known of the Matthay teachings is that concerned with forearm rotation, an element which he in later years termed "perhaps the most important of all pianistically, physiologically, and pedagogically" (Matthay, 1931, p. 137).

> Constant changes in the state of the fore-arm's rotary Release and rotary Support are imperative, if the fingers at opposite sides of the hand are to be equally "strong"; i.e., if the little finger and the thumb are to have equal successive apportionments of weight (or resistance) to act against, when one of these fingers is applied against the key. Weight must be released rotarily towards the little-finger side of the hand, when the little finger is required to work effectively against its key;—a rotary lapse of the fore-arm, that must be precisely reversed, when we wish forcibly to employ the thumb. In the same way, we have rotarily to support the thumb-side of the hand, when we wish to employ a finger at the opposite side of the hand alone; and we must reverse the process, when the little finger side of the hand has to be held off the key-board" (Matthay, 1903, pp. 13-14).

As I previously mentioned in Chapter Four, at the elbow joint we have two possible movements: (1) unbending/bending and (2) forearm rotation. In piano playing, we use both of these movements. For example, we use unbending/bending motion for creating staccatos in chords, and we can take advantage of forearm rotation in passages containing wide leaps and trills. The first most-practiced piano technique that I would like to discuss is *rotation*.

The first musical example is Scarlatti's Sonata, K. 2 in G major (Figure 38).

This piece is very challenging because it is full of octave leaps, in combinations of broken 4ths, 3rds and 6ths. One of my students, a seven-year-old girl, struggled with the leaps and lateral movement of broken 6th intervals in the right hand. After I showed her forearm rotation, she could play the notes more accurately and easily, without stretching her hand. Playing in rotation is vital for this piece, especially for students who have small hands.

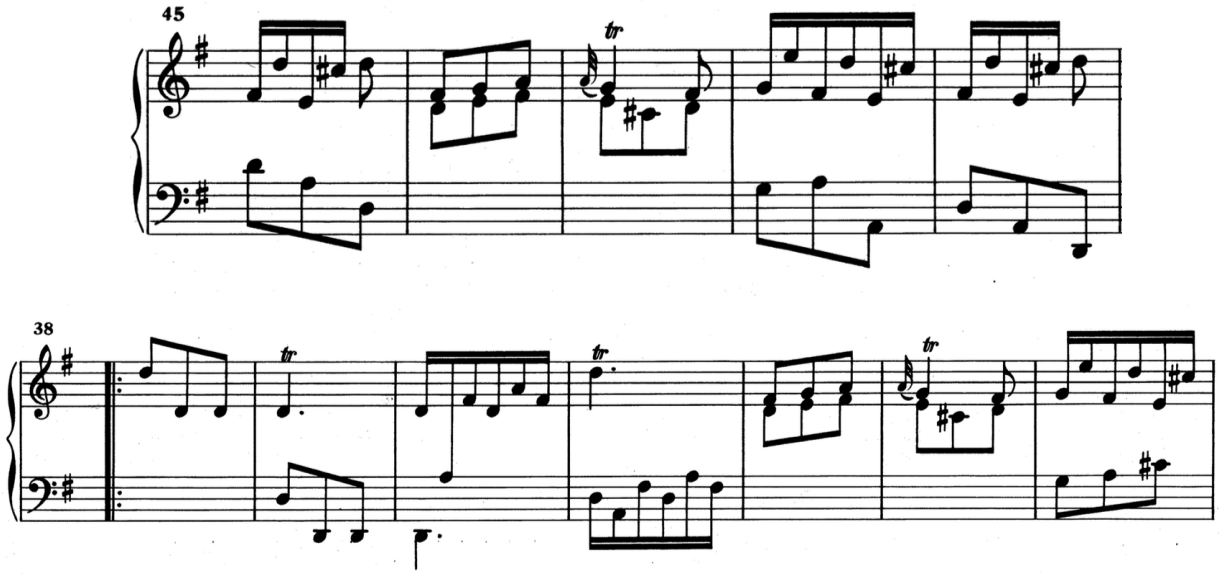

Figure 38: Scarlatti Sonata, K. 2 in G Major

The second musical example is Beethoven's Piano Sonata, Op.10, No. 2, third movement. The tempo marking for this piece is *presto*, and it includes an immense number of broken octaves. Additionally, while the student is playing broken octaves in quick tempo, Beethoven also requires the student to jump to a 5th (in the right hand) while jump down to a 4th (in the left hand). One day a student came up to me and told me that he was having tension in his forearm

and that he could not play at the tempo marking that we had agreed upon at his last lesson. He claimed that he was using rotation. I observed the kind of movement he was using and noticed that he was trying to do the rotation with his forearm muscles. In this particular piece, rotation happens at the elbow joint, not from the forearm muscles or wrist. Marsh states, "Pianists often try to use superficial muscles to rotate the forearm, resulting in tension that interferes with the freedom of movement. The muscles on the top and bottom of the forearm that can be easily palpated are primarily for opening, closing, curling, and straightening the fingers, and for moving the wrist" (2012, p. 37). Thus, students should consciously strive to discern from where the forearm rotation is coming.

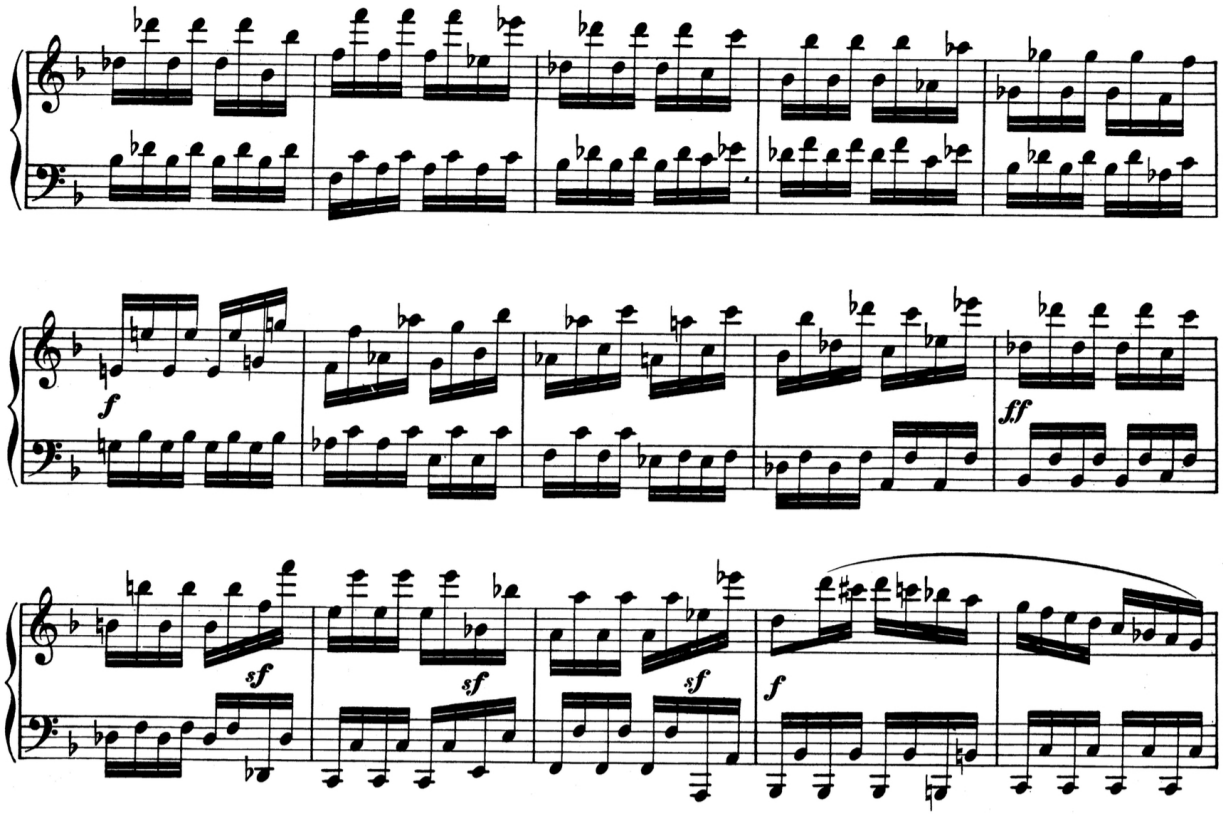

Figure 39: Beethoven's Piano Sonata, Op. 10, No. 2 , Third Movement

The third musical example, Beethoven's Sonata, Op. 10, No. 3 (first movement), is also an excellent example for illustrating the forearm rotation at the elbow joint. The broken intervals require slight movements from left to right.

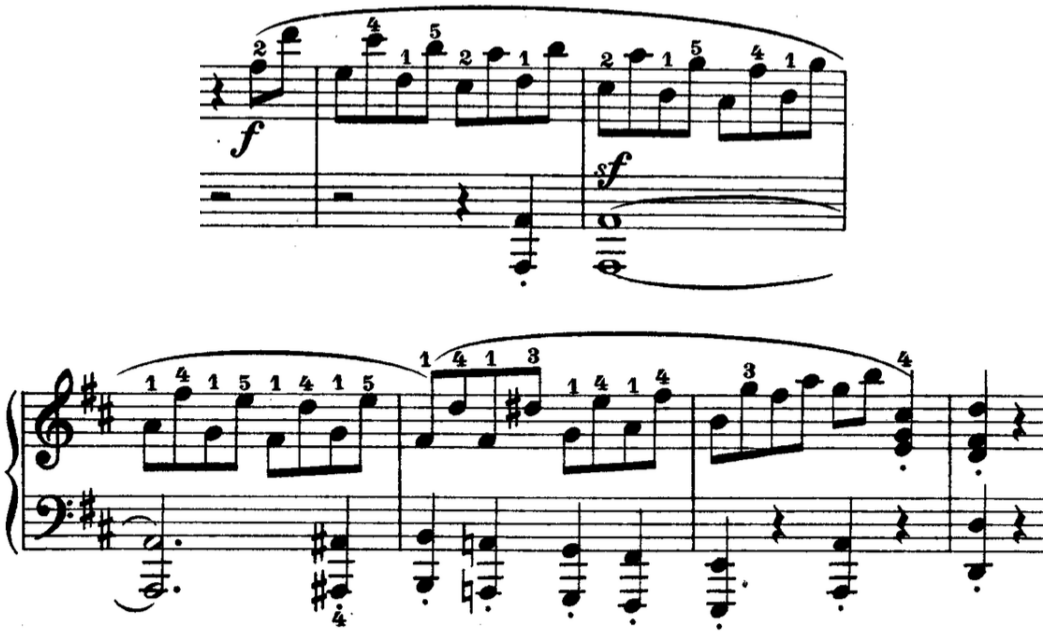

Figure 40: Beethoven's Piano Sonata, Op. 10, No. 3, First Movement

Trill

The second topic is the *trill*. The wrist is made up of eight bones and oriented in two rows of four bones each (Mark, 2003, p. 34). Due to our wrist structure having three joints, our wrist has flexibility. I often notice that the students tend to fix the wrist at one position and use only fingers to create the trilling sound. Commonly, these students experience forearm fatigue and strain.

What is the easiest way to play the trill? The students need to use the various wrist movements along with forward and backward shaping and forearm rotation.

Chopin's Nocturne, Op. 62, No. 1 is a well-known advanced piece involving continuous trills in the middle section. It also has a descending melodic voice over the trills. A student came to the lesson with full motion of the rotation and questioned me why her melodic line stops at every measure, producing a disjointed melodic line. Since the right-hand notes are constantly descending with trills, I suggested that she use lateral motion along with micro-movement of forearm rotation. I also made sure her right elbow was free of unnecessary tension so it could come along with her wrist and her fingers. After she changed from full motion of rotation to the micro-movement of forearm rotation, her melodic line became more continuous. As a result, she was able to play the trills at full speed and prevent forearm strain.

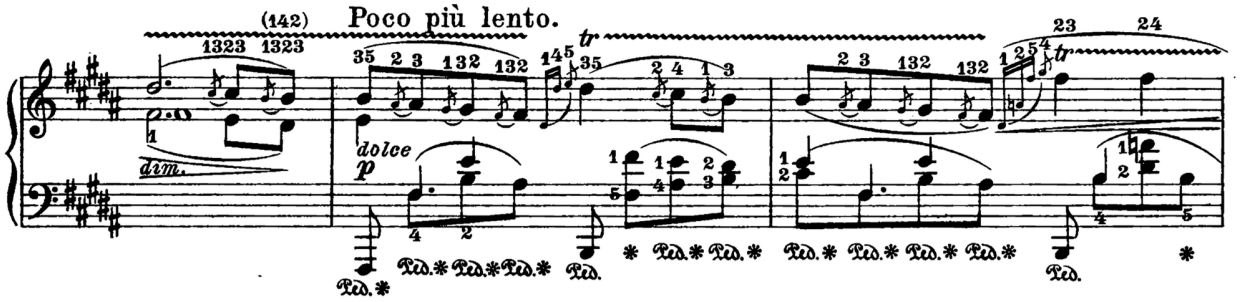

Figure 41: Chopin's Nocturne, Op. 62, No. 1

An eight-year-old student is currently learning Mozart's Rondo, K. 485; I noticed that his "non-playing" fingers were held up in the air when he was playing the trill. I also noticed that he fixed his wrist at one position and created the trill using only his fingers. He acknowledged that he was feeling forearm fatigue. In these trill passages, he needed to play the trill with only the second interval notes apart from each other (for example, b to c-sharp, e to f-sharp, and e to f-sharp). Because of this, instead of his using the full forearm rotation at the elbow joint, I suggested he use micro-movement of the rotation while feeling a loose wrist. I also suggested he switch the fingering to 1-3 instead of 2-3, even though I feel that the 2-3 fingering is actually better than 1-3 in this passage. This student is still in the process of absorbing the rotation technique on trills; thus, the 2-3 fingering will be difficult for him to employ while releasing the thumb tension as he plays the trill.

After we switched the fingering from 2-3 to 1-3, he easily played the trill using the micro-movement of the rotation. His "non-playing" fingers were "asleep," so to speak, relaxed.

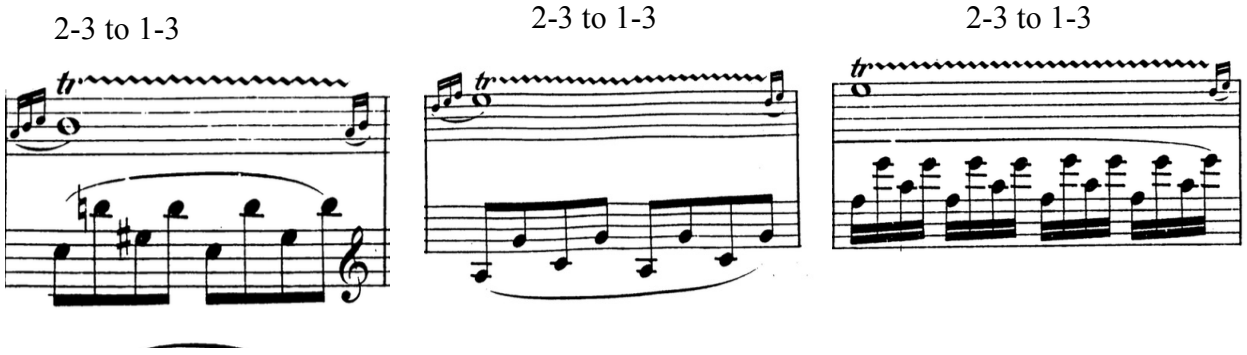

Figure 42: Mozart's Rondo in D Major, K. 485

Forte Chord

Third is the issue of the *Forte Chord.* When students see the *forte* dynamic marking, the first thing they often do is push harder at the keyboard to create a bigger sound. If students make a sound with this motion, they will indeed create a bigger sound; however, the sound quality will be rigid and harsh.

In *Piano and Song, How to Teach, How to Learn, and How to Form a Judgement of Musical Performances*, Friedrich Wieck, the father of Clara Schumann, emphasizes the importance of the flexible wrist:

> The tones which are produced with a loose wrist are always more tender and more attractive, have a fuller sound, and permit more delicate shading than the sharp tones, without body, which are thrown or fired off or tapped out with unendurable rigidity by the aid of the arm and forearm (1875, p. 27).

Rather than using only the fingers to create a bigger sound, the students need to experience the freedom of the forearm, power of the spine, and ultimately the freedom of the entire body. Hence, *forte* connotes freedom, not force!

In the Ballade, Op. 100, No.15, Burgmüller marked the last chord *Sforzando*. If the student tries to use only the fingers, this chord will sound harsh. I suggested to a nine-year-old student to try these two methods: (1) after playing the last chord in full volume, quickly take your hands off the keyboard and hug yourself; (2) now, replay the last chord; but this time, shake your arms after playing it in full volume and drop onto the keyboard with your whole arms' weight, loose wrists, and "floppy" elbows. After he experienced the two methods, his approach on the keyboard had more roundness and fullness of sound.

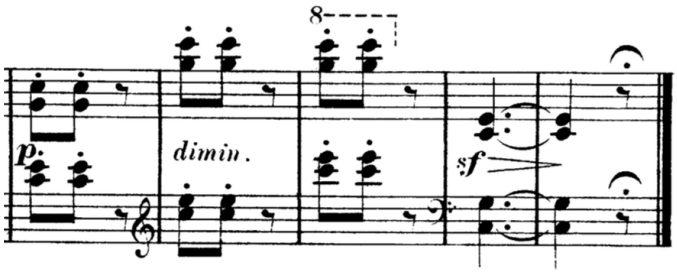

Figure 43:
Burgmüller Ballade, Op. 100, No. 15 - Last Chord

"Knight Rupert," No.12 in Schumann's *Album for the Young*, is one of the most technically difficult pieces among the thirty-eight in this collection (Magrath, 1995, p. 237). It has many groupings of 8th and 16th notes, and those groups also leap from one to the other in quick tempo. Another challenge is to play the singular line of the notes and also be able to jump and then create the *forte* chords. Frequently, I hear students who are playing in very rigid and harsh *forte* chords while missing numerous notes.

Giving a lesson to an eight-year-old student, I asked him to release tension in the elbow joint and feel his free elbow while using the whole arm to create the sound. I also explained to him about the three wrist joints and how our wrists can be flexible due to this structure. After my explanation, without giving him any extra examples, he could project the fuller and more buoy-ant sound of *forte* chords.

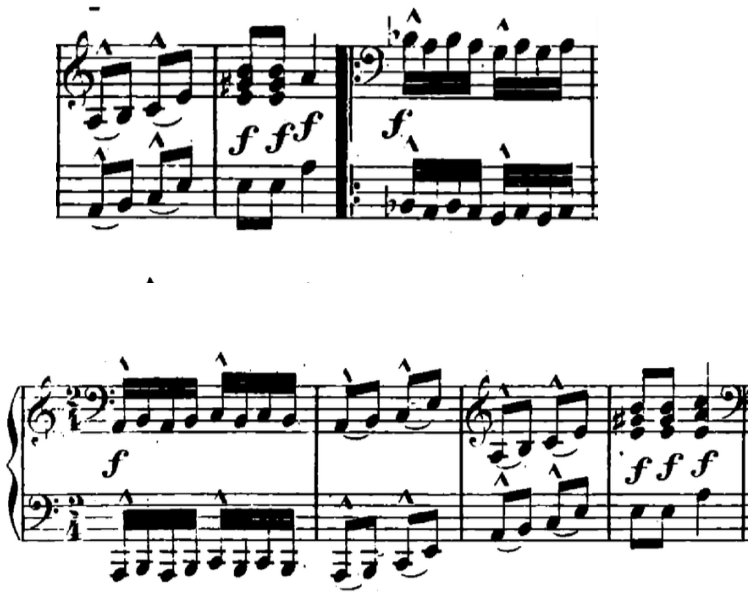

Figure 44: Schumann's *Album for the Young*, Op. 68, No. 12
"Knight Rupert"

In *The Groundwork of the Leschetizky Method issued with his approval by his assistant Malwine Bree,* Bree wrote, "Relax the wrist instantly after the stroke; then it will be unnecessary to expend more strength than is requisite simply to hold the keys down. Thus the hand rests, and can better resist fatigue" (1903, pp. 33-34).

As previously mentioned, we have various piano repertoires that require us to play *forte* chords. To create a fuller sound, young students especially must understand both the flexibility of the wrists and the whole arm structure. Without absorbing and understanding these two important concepts, a student cannot create the pleasing quality of a fuller sound. Due to the empirical teachings and analytical data from Body Mapping technique, I agree with what Bree wrote about having a loose wrist being the key for playing a *forte* chord.

Non-Involved Fingers and Hand Positions

Lastly, I would like to discuss *non-involved fingers,* especially in passages of horizontal movement. I notice that all my college students have a misunderstanding regarding non-involved fingers. They believe that they need to fix and hold one position to create a certain shape of their hands and fingers. This will create a rigid position; and, moreover, it will make it impossible for students to instantly release the note after playing it. Ideally, students need to have a free open hand with no unnecessary tension on the uninvolved fingers.

Playing Friedrich Kuhlau's Sonatina, Op. 55, No. 3, a student was getting a rigid sharp sound in the opening three measures of 6ths in the right hand. I saw that her wrist was too low and, because of that, her "non-playing" fingers were all lifted and held in the air, creating unnecessary tension. I showed her a model of the anatomical wrist joints and asked her to loosen her wrist. Even then, her "non-playing" fingers were still taut in the air. I suggested that she raise her wrist a little bit higher than her knuckle. She corrected her hand-shape, and her "non-playing" fingers were at ease. Due to her altered hand-shape and movement, the sound became much more mellow.

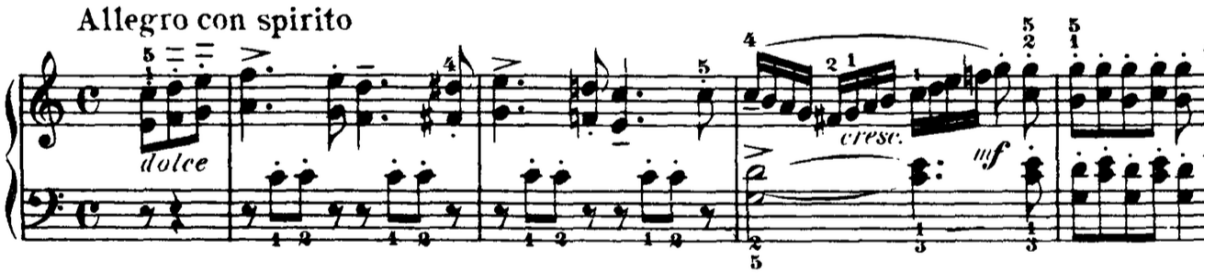

Figure 45: Kuhlau's Sonatina, Op. 55, No. 3, First Movement

The famous pianist Joseph Lhevinne commented on the the change of hand position:

> Often pupils struggle with difficult passages and declare them impossible, when a mere change of the hand position, such as raising or lowering the wrist or slanting the hand laterally, would solve the problem (1972, pp. 34-35).

As I experienced with my Kuhlau's "Sonatina" student, Lhevinne's "mere change of the hand position" can be effective. I suggested raising her wrist, and it was much easier for her to feel the wrist rebound movement. A slight change of position can additionally help the student to feel the possible benefits of a supple hand.

The next musical example is from the Japanese composer, Joe Hisaishi, born in 1950. He composed "One Summer's Day" for the sound track of the film *Spirited Away* (2001). I became familiar with this piece through teaching one of my Japanese students. Towards the end of the piece, the music has consecutive chords in the right hand, and it is challenging due to the facts that (1) the right hand has the melody over the top line in chordal shapes, and (2) it has numerous lateral chordal movements with leaps. My student told me that she was experiencing forearm tension, and even her fingers were tiring. I asked how she played; she showed me, and we discovered that she was using only the arm and fingers. She described her previous background of learning: Her teacher in Japan had put a coin on the top of her hand and insisted that she not allow the coin to fall off when she played. Because of this training, she was not aware of how to involve the elbow or wrist joints.

I showed her the anatomy of our wrist bones and joints. I also showed her how she could activate flexible movements through these joints. I first had her drop her right hand from the air to the fall board of the piano, so that she could feel her loose wrist and free elbow. After she had a clear idea about flexibility of the wrist and free elbow joints, we then moved to the keyboard. She finally perceived how to access the whole arm, and she was excited that she didn't have to use any unnecessary extra effort. Previously, she had tried to make staccato only with the fingers, so it caused her to have forearm strain. When she realized that there is a new, easier way to play the staccato chords, she was delighted.

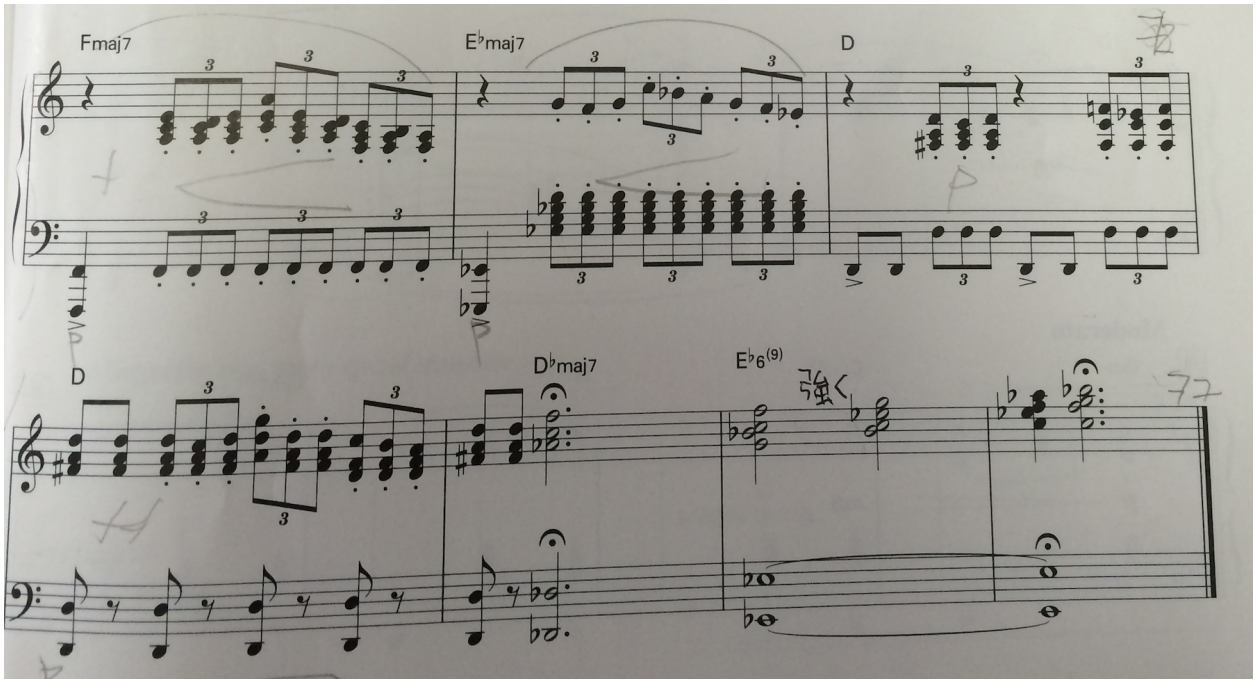

Figure 46: “One Summer’s Day” by Joe Hisaishi (2001)

I have presented nine musical examples in this chapter. Some of the musical examples are currently being learned by my students, and others are repertoire that I have already taught my students. I have focused on the issues that I encounter in teaching, and I have demonstrated how I helped—and am helping—students with Body Mapping knowledge.

This study and knowledge has a positive and lasting impact on students. Without my including and explaining extra analogies or examples, the students are easily able to change the movements of their joints (fingers, wrists, elbows, shoulders, and sterno-clavicular) after they change their internal self-representation via their body mapping. Because of their now-fluid joints, the sound of their music naturally becomes more fluid. The freedom of the whole arm, including collarbones, shoulder blades, forearm and wrist, hands, and fingers, and the powerful effect of the properly positioned spine are the keystones that students need to be mindful of in order to achieve effortless and buoyant playing.

Chapter Six

Conclusion

Music: "An art of sound in time which expresses ideas and emotions in significant forms through the elements of rhythm, melody, harmony, and color." [1] This, for me, defines the nature of music. In order to make music, one must possess technique as a basic facility, the development of which requires long-term effort, dedication and love of process. University students who major in music have had numerous years of training and education, and continue to strive hard to polish their technique through long hours of practice. If one practices with optimal awareness and self-examination, technique gradually becomes more sophisticated, refined, and effortless. As mentioned in previous chapters, our bodies are different: for example, one might have been born with more flexibility than another. Because of such variables, a teacher cannot force students to follow one method of playing.

Complete virtuoso technique demands great sensitivity to the variation of the muscular movements, awareness of the senses, and the ability to respond accordingly. For me as a teacher, I have found Body Mapping to be the best possible pedagogical method for focusing on these elements. It is indeed essential for both students and teachers. Body Mapping conceptualizes principles which will help students ultimately perform more efficiently. It is crucial for students to acquire knowledge regarding their body's structure and function, which, as a result, will facilitate ease of playing. As shown in Chapter Five, various students have applied Body Mapping principles, with excellent results, to their study, practice, and performance.

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[1] *The American College Dictionary*

We are our own best teachers. When we study music at the university level, we normally receive one lesson per week. During the lesson, the teacher helps the student to understand the music in depth, tries to accentuate the student's potential abilities and answers questions, both technically and musically. Beyond the hour of private instruction, students need to practice by themselves to develop a process for attaining and internalizing anatomical knowledge, accessing and deepening sensory awareness, and discerning and responding to every learning opportunity in their practice.

Students strive to master a piece. If they know the structure and function of their muscles and bones, they can move more easily and efficiently. The appropriate movement will help produce the sound that one hears in one's mind. Graham states the following regarding the relationship between physical movements and its efficiency in music:

> I pose the question: what is the role of the physical mechanisms in all this? Clearly, my mind's role is as organizer, integrator, conceptualizer, and evaluator of sound is in charge. My ear's role is that of an attentive, aware, absorber of all my mind can handle. My fingers are under the direction and control of both my mind and my ear, and are the executors of what messages they get from my brain. However, their role—as is the role of all my physical equipment involved—hands, wrists, etc.—is critical. The physical element in the production of beauty is as essential as that of the mind's conceptualizing and the ear's acuteness. All three aspects are indispensable and interrelated…. It can be done with a wealth of physical approaches, I believe. Yet, I also feel that there are more efficient and less efficient ways to get a particular sound. Certain ways of using our physical equipment seem to make the exquisite control so necessary, easier to achieve (1994, p. 45).

Throughout the previous chapters, my insights are drawn from my personal teaching experiences. It is my sincere hope this dissertation will optimize the piano teacher's *tool-kit* and help students have a clear understanding and appreciation of their body map and sensory

sensitivity. Ideally, they will achieve efficient practice habits and, even more, high-quality performance.

Lastly, I cite an astonishing paragraph by Ethan Kind, distinguished Alexander Technique teacher. It is a story of his giving an organist her first Alexander Technique lesson. The organist wished to recapture the freedom and ease of performance that she had experienced in her undergraduate recital twenty years before. Kind describes how he gave her the physical instructions for correcting her sitting, improving her awareness of removing tensions from her hips, ankles and feet, and releasing the tension in her neck and shoulders. Then, next, he describes how he introduced the idea of playing as a gift:

> Next, I introduced the idea of playing only as a gift, which Dr. John Diamond has written so beautifully about in *Life Energy in Music*, Volumes I, II and III. I had her play as a gift for me, then as a gift for herself, then as a gift for someone she loved dearly, then as a gift for God and finally as a gift for us all. It was profound. The intention of playing only as a gift, removing what did not work physically, and trusting her hands took her fully back to what she had done years ago (2007, p. 26).

In order to make a beautiful tone, we need to experiment to find our physical movements that will create the beautiful tone (Fleisher, 1963, p.12). As mentioned previously, after absorbing the technical knowledge of Body Mapping principles, we need to be mindful to diagnose and respond to and apply them accordingly. That is utterly different from constant self-criticism, which can eventually lead to hurting oneself emotionally (Kind, 2007, p. 26). To produce exquisite music and to have a bravura performance, we are obliged to develop the technique that gives us the ability to have the freedom, mentally and emotionally, to “play as a gift for us all.”

Having a career in music is a difficult journey; but at the end of the striving trek, it brings many treasures into one's life. One treasure is the realization that you helped some people not just in physical but also in psychological ways, and brought comfort and joy to them. Music is a field that requires patience, constant exertion, devotion, and love intertwined to create this positive result in the human community.

This is the reason we (performers, teachers, and students) dream not just of being a virtuoso pianist but of becoming a musician who can have a positive influence and give happiness, joy, and solace through music to everyone, from children to seniors. Music-making by absorbing and applying the technical knowledge of Body Mapping principles, is an effective means towards an enriched and enriching musical creativity.

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Illustrations

APPENDIX

Common Mapping Errors

by Barbara Conable

The Head:

-that it includes the jaw and begins at the bottom of the jaw. People who believe this will try to move their heads as if from the middle of the neck, four or five vertebrae down from the actual joint. These people almost never look up, as if at the moon, because the scrunching hurts too much, and they can't look down freely down from the head's joint with the spine so they thrust their heads and necks down and forward as a unit if they want to look at a desk. This puts terrible pressure on the area where the cervical curve gives way to the thoracic curve, leading eventually to a painful hump in that area.

-that the base of the skull is a membrane or that the base of the brain is protected only by the top vertebra. One woman told me that every time she moved her head forward and up she imagined that her brain was dripping down her back. Other people tell me they are afraid something will be able to puncture their brains if they leave the area just under the base of the skull unprotected. Needless to say, these people will pull back down again the minute they feel they can in order to prevent the horror the map dictates if they keep going forward and up with their heads. Once they see for themselves that the base of the skull is a very secure, wonderfully protective bony plain they no longer feel the desperate need to pull back down and they begin to learn about freedom.

-that the head moves from the top. These are the people affected by the string-from-the-top-of-the-head fantasy. I devise ingenious little purgatories for teachers who propagate such nonsense. People who try to move their heads from the top always stiffen their necks. When people find out they can move their heads at its bottom at an actual joint they are greatly relieved and they free their necks rather than stiffen them.

-that the head rests on the spine near the back of the base of the skull. Whew! Think of the muscular effort it would take to hold it up! Actually, the head was supported near its back in ancestral primates. It took nearly ten times the muscle mass to hold the head erect and those creatures weren't even trying to stand upright.

The Neck:

-that it is donut shaped, a sort of O-ring. In one version of this fantasy the muscles of the neck go round and round, a kind of collar. “I feel as though I’m being choked by my neck.”

-that the muscles are small and weak.

-that the neck is just at the back. No. The neck includes all the head moving muscles on the front and sides as well as the back. Thinking just of the back of the neck accounts for the weird tucking of the chin that some people do in the attempt to go forward and up with their heads, freeing the back of the neck (so they think) at the expense of the front. This is especially common in Europe where Alexander’s word neck is sometimes translated into a German word that does mean the back of the neck. Tricky.

-that the bottom of the neck is at the top of the collar, especially common in men. The poor men drop everything south of the top of the collar into the chest in their maps and suffer a caving-in of the top of the torso as a result. Usually the buttons on a button-down shirt fall right at the collarbone, so if you must map your body with regard to your clothes (not a good idea) then please map your neck at the bottom of your business collar, not at the top.

-that the muscles of the neck surround one or two or three vertebrae. No. They surround seven vertebrae. They do also on a giraffe. The giraffe just happens to have foot-deep vertebrae. When people get nicely lengthened out and they say they feel like a giraffe, they are getting close to the truth. They are like a giraffe.

-that the neck muscles have some role in speaking and singing. Not here on earth. In heaven there are great choirs of neck muscles finally getting to sing, but not here. The neck muscles only get to move the head around to look here and there as the singer sings, here at the lover, there at the moon, there at the surprising letter just brought by the footman, there at the floor, back at the lover, back at the moon, and so on and so on.

The Jaw:

-that it hinges behind the ear. Try out what this would be like.

-that it hinges at the two ends of the horseshoe shape at the bottom. Try it

-that it hinges just below the corners of the mouth. (Jaw=chin.) Try it

-that there is bone filing in the whole horseshoe at the bottom. Try it.

-that its joint is at the coronoid process, the roughly triangular projection which slides along the cheekbone as the jaw opens. Try it.

-that there are two jaws, an upper and a lower. Try it.

The back:

-that the back is the body's main support, rather than the spine.

-that the spine is just the little bumps you can feel running down your back.

-that the back is some sort of solid bony plate.

The Spine:

-that it is small, as big around as a dime, or a quarter, or a fifty-cent piece.

-that it is a rod, "like a broom handle."

-that it bears weight near the surface of the back.

-that the weight-bearing part of it is exterior to the ribs.

-that it is straight. Some people do manage to make it nearly so.

The Pelvis:

-that the pelvis is a bowl. The pelvis is so little like a bowl it won't even hold a ten pound baby once nature has decided its time for the baby to leave its mother's womb. The pelvis of a full size skeleton might hold a soccer ball if the pelvis were never tripped because the pubic bone does come up some in front, but it wouldn't begin to hold a bunch of soft balls and it certainly won't contain strawberries and cream.

-derived from the bowl image, perhaps, that the pelvis covers the abdomen in front.

-that there are spool-shaped “sits bones” or “sit bones” appended to the bottom of the pelvis on which we must precariously balance. Rather, the pelvis itself is rocker-shaped at the bottom, providing a support that is reliable in any position.

-that the pelvis is one massive bone, therefore vulnerable. Rather the pelvis is two medium-sized bones jointed at the pubis to each other, at the top to the sacrum(the delta-shaped bone at the bottom of the spine) on either side, and near the bottom to the thigh bone on either side. There is considerable ability to bear impact because of the cushioning at the public symphysis (not a bone, but the place where the two pubic bones meet) and some resilience at the sacroiliac joints, and then, of course, it’s nicely padded all around.

-that the front of the pelvis lines up with the lumbar spine.

-that there is no movement in the pubic and sacroiliac joints. In fact, there is some-a little-with every breath.

The Tailbone:

-that it must bear the body’s weight in sitting or standing. People say, “My tailbone gets so sore because it has to take all my weight. It’s so small.”

If the tailbone had to take our weight it would soon disappear. Tiny bones disintegrate under lots of weight. Fortunately, in standing our weight is delivered out to the thigh bones, and in sitting it is delivered down into the rockers well in front of the tailbone, which just floats there. I have explained elsewhere that the non-weight bearing pat of the sacrum and the tailbone are in the body to shape Levis. (They also form the attachments for important muscles and ligaments.)

The Hip joints:

-that they are near the top of the pelvis, often at the iliac crest. This illusion creates lower back pain and interferes with mobility at the hip joints. It’s one of the factors in the phenomenon which in the vernacular is called tight-assed.

-that they are quite close together. Epidemic among dancers, who tend to think of the hip joints as being just on either side of the pubis inside the pelvis. That’s where ninety percent of them put the tips of their index fingers when they work on turnout. I always imagine the heads of their femurs looking at each other across a little space, never quite able to touch. If this fantasy were true, of course, non of us would have had a human birth.

-that they are a ball and socket, the socket being separate from the pelvis and massive. You should see the drawings. Ball and socket is a bad metaphor.

-that the sockets open toward the floor and the thigh bone is stuck up into it deep in the pelvis. For these people movement of the leg more than a few inches in any direction is ill-advised.

-that it is a joint at which the legs can move in relation to the torso, but not the torso in relation to the legs. These mappers believe that they must bend forward from their waists because it is their only option. The torso just can't move forward at the hip joints. Such a person may take five minutes toward at the hip joint will at first feel supremely strange and then supremely wonderful. People say, "That's what my tennis coach has been trying to get me to do!" You don't want to know what the tennis coach says.

-that it is a line at the very bottom of the torso, like a Raggedy-Ann doll.

-that the legs are attached to the "sit bones" (ischial tuberosities) at the very bottom of the pelvis.

-that the joint is at the top of the arch of the groin, and that the resilient tendon of the gracilis muscle is bone.

-that legs are attached to each other and the genitals lie below the meeting of the two thigh bones.

The Ankle:

-that it is the two bumps that are the bottom of the leg bones. People really try to swivel the foot from those two points. In my old map those bumps were the top of two bones that went all the way down into the ball of the foot. No wonder it took me many months to recover full range of motion at the ankle after I had correctly mapped it.

-that the ankle is at the top of the heel bone in black, in the depression just forward of the Achilles tendon. This is consistent with the L-shaped foot.

-that the ankle is not a joint at all, but just where the leg ends and the foot begins. People who won't release the ankle as they come out of downward pull often fall in this category. They are not moving forward onto the arch of the foot because they don't believe they can.

The Foot:

-that the foot is L-shaped, that weight passes down through the back of the lower leg into the back of the heel and forward into the rest of the foot.

-that the toes are part of the arch, causing a gripping of the toes.

The shoulder:

-that there is one upper arm joint instead of two. Suffice it to say this error often ends in injury and always limits technique. The one joint is fantasized as being somewhere between the two actual joints, which are the joint of the collarbone and the sternum and the joint of the upper arm with the shoulder blade.

-deriving from the above-stated error, that the upper torso is relatively or completely immobile. The person who does not know that there is a joint of the collarbone and sternum from which movement up and down and back and forward is available will never make those movements, even when it makes perfect sense to, as in swimming. When they begin to move there because someone show them that the joint exists, they are first incredulous and then delighted because movement there feels so good.

-also from the same source, that the shoulder blades are attached to the spine and therefore not mobile.

-that the shoulder blades are attached to each other and therefore not mobile.

-that the shoulder blades are attached to the base of the skull and therefore not mobile. Actually, this one is rare, but I mention it anyway.

-that the upper arm attaches to the spine, or to a socket off the side of the spine. This usually derives from a teacher's saying something like, "Well, the arms really comes off the back," a statement that is defensible on certain grounds but which will profoundly confuse some students if it is not made utterly clear what is meant.

-that the upper arm attaches to the ribs.

-that there is a shoulder girdle which is a mirror image of the pelvic girdle. In this fantasy most of the upper torso is bone and immobility is dictated by the map.

The Elbow:

-that the elbow is the bump at the bottom of the ulna, often mapped as separate from the ulna, usually regarded as capable of slipping and causing all sorts of difficulties.

-that the joint is of an upper arm bone and a lower arm bone, in which case the lower arm will not be mapped for rotation and the student is likely to do rotating at the joint of the upper arm

and shoulder blade that shoulder be done at the elbow instead. (For instance, turning a door handle or a steering wheel.)

-that the lower arm rotates around the radius, that is, around an avis on the thumb side of the lower arm. This error is the cause of most tendinitis at the wrist or elbow in musicians, carpenters, and tennis players.

The Wrist:

-that the wrist is those two bumps at the bottom of the radius and ulna.

-that it is the place above those bumps where you wear your write watch.

-that the hand bones meet the arm bones directly, creating a hinge effect. People can actually give the wrist a hinge-like character if they believe this.

-that the hand turns over at the wrist and the forearm isn't part of the motion

-that the wrist is a ball and socket

-that the rest position of the hand is the thumb lined up with the radius. This insures a chronic contraction of the outside of the wrist and destroys the inch or inch and a half of mobility at the wrist toward the thumb side of the hand. This is a serious handicap for pianists. They need that inch or so of movement.

The Hand:

-that the fingers begin at the edge of the palm where the lines are seen that seem to people to correspond to the lines at the first and second joints of the fingers, counting from the tips. In fact those lines fall between the second and third joints, as can be readily seen by looking not at the palm but at the back of the hand. People who try to place the joint at the lines on the palm always have stiff fingers and a curled back of the hand that ruins finger dexterity.

-that fingers have muscles. There are muscles that attach to the finger tendons near that proximal ends of the fingers, but there is no muscle that can be built on fingers the way a bicep is built on an upper arm, which is what some people imagine, especially when they do finger exercises.

-that the palm contains no muscles.

-that the bone in the palm in a bony plate like a shoulder blade. Really there are four bones (not counting the thumb) and they move!

-that the thumb is the first two segments from the tip, putting its connection at the edge of the palm, not at the wrist. People who have the thumb mis-mapped have lost significant mobility of the thumb and always have a very prominent second joint and a sort of caved-in space between the second joint and the wrist. [1]

[1] Barbara Conable, *How to learn the Alexander Technique*, (1992, Chicago, GIA Publications, Inc.), p83-93