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I, Gustavo Carpinteyro-Lara, hereby submit this original work as part of the requirements for the degree of Doctor of Musical Arts in Violoncello.

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The Application of the Kinesthetic Sense: An Introduction of Body Awareness in Cello Pedagogy and Performance

Student’s name: Gustavo Carpinteyro-Lara

This work and its defense approved by:

Committee chair: Lee Fiser,

Committee member: David Adams, M.M.

Committee member: Bruce McClung, Ph.D.
The Application of the Kinesthetic Sense: An Introduction of Body Awareness in Cello Pedagogy and Performance

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by

Gustavo Carpinteyro-Lara

BM, University of Southern Mississippi, 2001
MM, Bowling Green State University, 2003

Committee Chair: Lee Fiser, BM
Abstract

This document on cello pedagogy and playing focuses on the importance of the kinesthetic sense as it relates to teaching and performance quality. William Conable, creator of body mapping, has described how the kinesthetic sense or movement sense provides information about the body’s position and size, and whether the body is moving and, if so, where and how. In addition Craig Williamson, pioneer of Somatic Integration, claims that the kinesthetic sense enables one to sense what the body is doing at any time, including muscular effort, tension, relaxation, balance, spatial orientation, distance, and proportion. Cellists can develop and awaken the kinesthetic sense in order to have conscious body awareness, and to understand that cello playing is a physical, aerobic, intellectual, and musical activity. This document describes the physical, motion, aerobic, anatomic, and kinesthetic approach to cello playing and is supported by somatic education methods, such as the Alexander Technique, Feldenkrais Method, and Yoga. By applying body awareness and kinesthesia in cello playing, cellists can have freedom, balance, ease in their movements, and an intelligent way of playing and performing.
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**CELLO CONCERTO No. 1 IN E FLAT, OP. 107**
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- Measure: first movement 86–108 of cello solo part

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Introduction

At present, if a cellist wants to improve his/her cello technique and method of playing, he/she will find books, methods, and dissertations that discuss how to play the cello, how to be a better musician, how to play without pain, and how to use different styles in cello playing. The cellists will try to find the solutions in cello methods, studies, and exercises, including those by David Popper, Jean Louis Duport, Andrein-Francois Servais, Alfredo Piatti, Aldo Pais, et al., that only focus on cello technique, but do not give any explanation about how a cellist’s body works while playing the instrument. In addition, books and methods by Diran Alexanian, Hugo Becker, Joachim Stutschewsky, and Emanuel Feuermann provide great detail about mechanical movements and mention that muscles and joints have to be relaxed, but without any further explanation. Also, there are some books about how to diminish pain during playing, which explain all kinds of performance medical problems in string players and recommend physical therapy exercises, but without focusing on body awareness, which is the root of many cellists’ problems. All these sources focus on the external movements of the body, without considering


the body’s natural ability to organize itself and the psychophysical preparation before a movement takes place. Some of these sources describe how one should play, hold the bow, sit on a chair, place the fingers, and what kind of motion is needed for a specific skill, and some suggest acquiring knowledge of certain somatic education methods such as the Alexander Technique, Feldenkrais Method, Yoga, Laban Movement Analysis, and Bartenieff Fundamentals.5

Another situation happens when a cello student tries to get help from his/her teacher. In many situations a cello teacher is not capable of helping his/her cello students, because students try to imitate the teacher’s gestures and motions without any physiological education and without understanding how the body works from inside. Janos Starker, cellist and cello teacher, mentions that there are two ways of cello teaching: coaching or incomplete-teaching, and complete-teaching. In coaching or incomplete-teaching one learns about musicality in cello playing, where the focus is on making music with a cello. A student will learn how to use more or less bow, sit up, practice longer, to lower their elbow, raise their wrist, play with good intonation, phrasing, etc. In other words, the student will learn how to play cello as a machine without any rational thinking about what he/she is doing and how he/she is doing it.6 In complete-teaching, one learns all about coaching-teaching and understands the importance of an intelligent way of playing that includes knowledge of cello technique and body awareness. This type of teaching is beneficial for any advanced, medium-level student, and even more important for late beginners because


they need to know how, what, and when the body works, especially the upper limbs, back, neck, and legs.

This study will focus on the application of the kinesthetic sense in cello pedagogy and performance, and will describe the kinesthetic, anatomic, physical, motion, and aerobic approach to cello playing with the support of somatic education methods, such as the Alexander Technique, Feldenkrais Method, and Yoga. Somatic education methods will help awaken the kinesthetic sense and connect the mind and body, and by applying body awareness and kinesthesia to cello playing, the cellist will be able to have freedom, balance, ease in movements, and an intelligent way of playing, performing, and teaching. The cellist will be able to understand that cello playing is a physical, aerobic, intellectual, and musical activity.

This document is divided into six chapters. The first focuses on a definition of the kinesthetic sense, an explanation of the use of the term kinesthesia over proprioception, the influences of kinesthesia on memory, and kinesthetic dysfunction.

The second chapter gives an explanation of the Alexander Technique, the Feldenkrais Method, and Yoga. In addition it explains the full yogic breath, kinesthetic awareness, and their application in constructive rest.

The third chapter focuses on the application of the Alexander Technique, the Feldenkrais Method and full yogic breath to the cellist’s sitting position. It takes into account the lack of information about the application of the kinesthetic sense in most descriptions of the cellist’s sitting position. Also, it includes a detailed explanation about how the center and line of gravity, and mechanical balance work in the cellist’s sitting position. Finally, it includes a detailed description of awareness through movement lessons to awaken the kinesthetic sense and its use in the cellist’s sitting position.
The fourth chapter focuses on the application of the kinesthetic sense to the cellist’s bow-arm, including an explanation of the right upper limb’s anatomy for body mapping, the semi-mountain posture, and breathing exercises for the body’s alignment. Also, it incorporates exercises to develop sensing and feeling weight from the right upper limb to the bow and string, an explanation about the function and use of the flexible right thumb, exercises to awaken kinesthesia on the right upper limb, and the kinesthetic application playing down and up-bow.

The fifth chapter concentrates on developing the kinesthetic sense in the cellist’s left arm, by applying the full-mountain pose, and explains in detail the importance of the sensation and use of the left arm’s weight to develop a solid left-hand technique. The discussion includes exercises to enable the cellist to sense the left arm’s weight, placing the left hand on the fingerboard, switching the left arm’s weight from one finger to other, and learning the left thumb’s role in low positions. Finally, this chapter explores on the left arm’s weight in shifting position, and its function in thumb position and vibrato.

Finally, the last chapter will explain how both upper limbs work kinesthetically differently from each other in cello playing, including a discussion about bilateral and quadrilateral transfer. Also, it will employ excerpts from the advanced cello literature to discuss the application of the kinesthetic sense to several situations in cello playing, including slow bow and vibrato, loud dynamics and vibrato, and different bow articulations, such as staccato stroke and controlled ricochet, double stops, and voicing double stops.
Chapter I

The Kinesthetic Sense

Many cellists feel their playing is not as good as it should be because often times they are doing things without considering their mind and body causing some kind of pain and uncomfortable sensations during playing. Cellists always look for a relaxed and a comfortable way of playing during practice and performance believing that by practicing longer and harder they will be able to find a solution to their problems. Some try to improve their technique and method of playing looking to find the solution on books, methods, and dissertations that discuss how to play the cello, how to be a better musician, how to play without pain, and how to use different styles in cello playing.\(^1\) The information in these sources is, without doubt, valuable, but explaining, for instance, how one should play, hold the bow, or sit on a chair, or how to place the fingers, or what kind of motion is needed to do for specific skill, might not help much.\(^2\)

Cellists do not realize that a lack of kinesthetic awareness or body awareness may be the solution of pain problems and uncomfortable sensations. This chapter focuses on definition of kinesthetic sense, an explanation of the use of the term kinesthesia over proprioception, how kinesthesia influences to the memory, and kinesthetic dysfunction.

The Kinesthetic Sense

The kinesthetic sense or kinesthesia is the first sense developed before the others during human embryo stage of life, because it allows the embryo move. This sense is the ability to know where all parts of the body are “in space, time and how they are moving in relation to each other.


\(^2\) Kim, 93–102.
and the environment.”\(^3\) Also, the kinesthetic sense alerts one to muscular effort, tension, relaxation, balance, spatial orientation, distance, and proportion. So it tells when muscles and joints are tense, in pain, relaxed if movement is slow or fast movement, etc.\(^4\) Craig Williamson, pioneer of somatic integration, writes that kinesthesia “is and interface between the body, the mind, and the emotions…because it provides the link that explains how emotional stress leads to musculoskeletal pain.”\(^5\)

During daily life kinesthesia works all the time even when one is not aware of it. If one would lose the kinesthetic sense, walking, for example, would be challenging because one would not know where the legs were or how it would feel to move them. One is able to move the legs because nerves and muscles work together as the neuromuscular system, which is the intelligence that guides and controls movement.\(^6\) It is possible because there are kinesthetic receptors in muscles, tendons, and joints. The kinesthetic receptors in the muscles are called spindle cells, which detect when a muscle changes its length and send signals to the brain so these receptors indicate “how much each muscle is contracting or relaxing.”\(^7\) There are also kinesthetic receptors across joints called golgi tendon organs that “detect and send the brain information about the amount of tension and effort occurring within the tendon.”\(^8\) Therefore,

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5 Ibid., 28.

6 Ibid., 56.


8 Williamson, 57.
with these receptors in muscles tendons and joints, the brain gets a signal and “uses this output to guide muscles movement.”

**Kinesthesia and Proprioception**

The terms kinesthetic sense or kinesthesia have been used interchangeably with the word proprioception, probably because differences in meaning between both terms are vague. Glenna Batson writes that proprioception has been defined as the sense of posture and movement including joint position, kinematics, “aligning of limbs posture, calibrating, balance, learning of a new movement, coordination, discrete multi-joint movement sequence.” William Conable, creator of body mapping, argues that the use of the word proprioception has prevailed over the word kinesthesia, and many authors consider kinesthesia an old term. However, Conable prefers the term kinesthetic sense since its root *kin* means movement, and *aesthesia* means feeling, while the root *prop* means proper. While Conable prefers the use of the word kinesthesia, Pedro de Alcantara, Alexander Technique teacher, and Oliver Sacks, neurologist and psychologist, use the word proprioception as a sense that concerns “all aspects of muscular activity: orientation in space, relative position of body parts, movement of body and limbs, the gauging of effort and tension, the perception of fatigue, static and dynamic balance.” However, Frank Jones, Alexander Technique teacher, gives a similar definition for kinesthetic perception, which “deals with the sensation of position and movement of heaviness and lightness of tension, effort and

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9 Williamson, 56.

10 Theresa Silow, “The Kinesthetic Sense: Exploring Sensation, Self-Emergence, Awareness and Stress Negotiation through Somatic Practice” (PhD diss., The Ohio State University, 2002), 21–22.

11 Batson, 3-4.


fatigue.”¹⁴ He also explains that kinesthetic impressions are the sensations of position, mass, and movement of an organism and its parts.¹⁵ Craig Williamson, pioneer of somatic integration, defines the term kinesthesia as the sense of muscular effort, tension, relaxation, balance, spatial orientation, distance, and proportion. He also adds that kinesthesia is “the sensory information that comes from muscles, joints and movement.”¹⁶ Erik Nordh, neurophysiologist and assistant professor at Umea University in Sweden, writes that both terms have been “used synonymously in many reports… and some authors use more or less explicitly the term kinesthetic for conscious processes and proprioception for related mechanism at lower levels.”¹⁷ Last, Rebecca Nettl-Foil and Luc Vanier, professors of dance and choreographers, claim that “kinesthesia and proprioception are sometimes used interchangeably; however, kinesthesia is most often used when referring to movement or in reference to concepts such as muscle memory and coordination.”¹⁸ Apparently, the difference between the terms kinesthesia and proprioception is still unclear because specialists on the field seem to use both terms either to describe or define the same criteria in human movement or to use them interchangeably. Therefore for the purpose of this document, I will use the term kinesthesia or kinesthetic sense because the most important sources for this research use it; in addition, it is a better term to describe movement action in the body while playing a cello.


¹⁵ Ibid., 165.

¹⁶ Williamson, 10–11.

¹⁷ Erik Nord, “Contributions from Muscles Spindles and Skin Receptors to Proprioception and Kinesthesia in Man” (Medical diss., Umea University, 1983), 2.

Kinesthesia, Mapping, Planning Relationships, and Movement Patterns

According to Williamson, “Muscles, bones and other tissues provide the structural support for movement, while the brain system orchestrates the use of this support” to create movement patterns, which are neurological and muscular processes that consolidate into a memory of an action. These movement patterns are the result of what Leela C. Zion, doctor in education and professor emerita at Humboldt State University in Arcata, California, calls mapping and planning relationships, which are reinforced through practice, trial, judging errors, and success. For instance, during first year at school, one learns how to write and read. Writing a simple word is a process that involves mapping relationships, which involves finding the correct letter, followed by planning relationships to know which letter follows another to create a word. Mapping and planning relationships require the brain to work at a higher intellectual level in order to write specific symbols such as letters, to order them in a sequence to create words, and finally to write sentences, which create meaning.

Ideally an intermediate level cello student already knows what each hand is supposed to do and the importance of being mindful in how he/she uses his/her self, which requires the brain to work at a higher level. The brain will have information about the hands’ movement patterns as a result of the mapping and planning relationships that were stored in the brain during practice. However, performing an action, movement, or skill that is full of tensions and unbalanced movements means that the movement patterns were learned without conscious thought, and mapping and planning relationships were formed in the brain when this movement was learned. The brain will have this information, and the student will perform this action following the mapping and planning relationships that were formed when this skill was learned. It is very

19 Williamson, 31–32.
20 Zion, 306.
common that one takes kinesthesia for granted practicing and playing without paying attention to movement. As a result of this lack of awareness, movements are done in automatic mode without considering kinesthesia, which causes the brain to work at a lower intellectual level. In order to change the way an action is performed and correct a bad habit, it is necessary to create new mapping and planning relationships by re-learning balanced movement.

However, if a cellist continues learning movements without conscious thought, he/she could get used to muscular tension to the point that he/she is not able to sense the state of the muscles, relaxed or tensed, having a faulty kinesthesia. This condition is the result of “learned insensitivity to kinesthetic input.”

**Kinesthetic Dysfunction**

Kinesthetic dysfunction “is the inability to sense the kinesthetic sense accurately, even when one intentionally attempts to pay attention to it” and is not being able to accurately sense whether certain muscles are relaxed or tensed. Kinesthetic dysfunction leads to a chain of reaction in the body because poor muscle use, which leads to higher muscle tension causing nerve pain till a serious injury happens. In addition, when one feels pain, that sensation can be a result of what is called vicious pain cycle, in which kinesthetic dysfunction is part of it. Pain can start any part of the body because of high muscle tension that leads to pain; “pain leads to restricted movement; restricted movement leads to kinesthetic dysfunction; kinesthetic dysfunction leads to poor muscle use; poor muscle use leads to higher muscle tension, that causes more pain; and so on.” For instance, a cellist who does not know why he/she feels a pain in the right hand during playing, he/she might be unable to feel that the right-hand muscles are

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21 Williamson, 15.

22 Ibid.

23 Ibid., 22.
working more than they are supposed to, causing pain. If a cellist squeezes the bow with the right thumb during playing, then he/she will be unable to feel the state of the right thumb. His/her mapping and planning relationships need to be corrected by awakening and refining the kinesthetic sense, so the cellist will be able to realize the state of the body, the right thumb and correct the habit.

Kinesthesia is an important sense that can be awakened and refined by body awareness, which will create new mapping, planning relationships, and movement patterns to be stored in the brain. Good kinesthesia will make muscles to perform with efficiency, interrupt the vicious pain cycle, and help eliminate bad habits that make unbalanced and uncomfortable movements. The kinesthetic sense can be refined and awakened by body awareness education through some somatic studies, which will let one to realize habitual responses to stimulus and choose change. Such representative somatic studies are Alexander Technique, Feldenkrais Method, and Yoga.

Understanding the importance of the kinesthetic sense, how memory is influenced by kinesthesia and how kinesthetic dysfunction might be the source of uncomfortable sensation and unbalanced movements in cello playing, will enable one to awaken kinesthesia and will help one to choose a better way of playing with supported and elegant movements that will improve both cello technique and musical interpretation. By awakening the kinesthetic sense, cellists will be able to consider mind and body during playing, which will result in a relaxed and comfortable way of playing and performing.

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24 Williamson, 20.
Chapter II

Somatic Education and the Kinesthetic Sense

Heather J. Buchanan writes that “somatic is the study of the coordination of the mind and body in movement.”¹ It can reveal a world of discovery regarding body awareness, which will awaken, develop, and refine the kinesthetic sense, helping any cellist to know how a task can be done with more ease and what it is needed to allow it. The cellist will be able to understand what is going on while movement is happening within the body and to learn how to judge movements and reactions that will let him/her realize what he/she does and chose a more efficient way of playing. Body awareness for a cellist will build the confidence to know what the body does and what he/she does not let happen within the body during and after playing a specific melody, phrase, articulation, or stroke. This chapter includes an explanation about the Alexander Technique, the Feldenkrais Method, and Yoga. Also it will include an explanation of the full yogic breath, kinesthetic awareness, and their application on constructive rest.

The Alexander Technique

Frederick Matthias Alexander (1869–1955) developed what today is called the Alexander Technique. He was born in Tasmania, Australia, and his passion was acting and reciting. He had some hoarseness during reciting and after years of self-study and experimentation, “he developed the theory of use of self.” In 1904 he moved to London, England where his technique was recognized. He also published several books, and in 1930 founded the first school to certify teachers. In 1940 he moved to the United States to continue teaching the technique and died at

the age of eighty-six.\textsuperscript{2} According to Frank Pierce Jones, this technique teaches how to do things in a smarter, more balanced and more practical way by eliminating and changing bad habits that they are considered the right and only way to do things. The Alexander Technique looks for how the body and mind work together as a unit to improve health, posture, and performance, realizing that they can not ever work separately.\textsuperscript{3} The Alexander Technique includes several principles: primary control, faulty sensory awareness, inhibition, directions, end-gaining, means-whereby, and use of self.

**Primary Control**

Primary control is the dynamic relationship between head, neck and back, and is in charge of the whole body or whole self-working efficiently, making every movement balanced, comfortable, and smooth.\textsuperscript{4} Alexander believed that once one releases unnecessary tension, primary control allows the body to move freely and in perfect balance, having smooth movement without pain. Primary control will guide the spine into perfect alignment that will allow having a natural control of the whole body, which in turn develop a more natural and balanced way of playing. Awareness is priority, as one has to understand that the freer the body is, the better one will be able to sense accurately what it is doing.\textsuperscript{5} Also, this kind of freedom will let one to know what one needs to do in order to have a successful practice and performance. On the contrary, if the neck is full of tension, the primary control can not be accessed, and one will not be able to sense that innate ease and freedom of playing. For instance, in cello playing shifting the left hand


\textsuperscript{4} Ibid., 27.

from the first to fourth positions will be easier when the head, neck, back, left shoulder, and left arm are free of tension.

**Faulty Sensory Awareness**

Alexander discovered that most people suffer what he called faulty sensory awareness.\(^6\) He “found that habitual misuse adversely affected the reliability of his kinesthetic sense and… his feeling of rightness in action was untrustworthy. He could not be sure that he was doing precisely what he thought he was doing.”\(^7\) In cello playing, one might perform a movement or skill with tensed arms and neck, and he/she might think and feel that those movements are correct and smooth. In reality, he/she is misusing the body because kinesthetically he/she is not able to sense the amount of muscle tension or energy needed to perform that skill or movement in a smooth way. His/her kinesthetic awareness is faulty or “debauched” as Alexander called it, because the kinesthetic sense is unable to provide a truthful picture of the use of the body, so that movement or skill feels correct to him/her.\(^8\) Unfortunately this person does not realize that this inability affects the perception of body awareness. For instance, a cello teacher might notice that the student squeezes the bow with the right thumb to control the bow, instead of letting the weight of the right arm to be on the bow. The teacher will explain this new concept to improve the bow technique without squeezing, and the student might be able to do it correctly during the lesson. However, at the time the student is alone practicing, he/she may feel wrong and uncomfortable in this new approach to holding the bow, and eventually, the student will return to

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\(^6\) Shao-Chin, 27.


\(^8\) Maria U. Weiss, “The Alexander Technique and the Art of Teaching Voice” (DMA thesis, Boston University, 2005), 56.
the habitual way of holding the bow. This happens because his/her kinesthethic sense is adapted to habit and understands that the usual way to hold the bow is the right way because of the mapping and planning relationships and movements patterns stored in the brain. On the other hand, the teacher’s way feels wrong and uncomfortable.

**Inhibition**

Inhibition is a “temporary suspension of an activity...[and] the suspension of the very wish to act.”9 Also it “is a matter of consciously refusing to respond in a stereotyped manner so that true spontaneity can manifest itself.”10 Alexander believed that “if one refused to respond in and habitual way the Primary Control would function properly, thereby ensuring the best possible balance of mind and body.”11

For instance, if one is about to play the beginning of Antonin Dvořák’s Concerto for Violoncello in B Minor, Op. 104 , he/she might try to play with a full sound. Before even playing the first note, the cellist might notice that he/she tenses up in the neck and shoulders while holding the breath. As a result the cellist might not get the sound that was expected. The cellist could believe that the best approach to fix this problem would be to practice more. However, if the cellist instead is aware of his/her self in relationship to the way he/she sits, holds the bow, and imagines the sound that he/she would like to get from the cello, and continues imagining playing the first two measures or more, his/her habitual response to playing would most likely be manifest. In the process of this thinking, he/she may realize that the body reacts by tensing unnecessarily. He/she should free the shoulders, neck, and back in order to allow the primary control to work properly.

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10 Gelb, 59.

11 Ibid.
Directions

Alexander discovered that after applying inhibition, he could not trust his feelings, so he had to “project a psychophysical pattern...allow[ing] the neck to be free to let the head go forward and up so that the back may lengthen and widen”\textsuperscript{12} Sending directions requires the brain to work in a higher level because this act of attention “involves a balanced awareness of oneself and one’s surrounding with an emphasis on whatever is particularly relevant at the moment.”\textsuperscript{13}

For instance when one send directions, he/she focuses his/her attention to the head, neck, and back. This attention alone could generate a change in the muscle tone, which one might sense it as a relaxed reaction that one should allow to happen since neck and back let the tension go. Sensing the state of the body and allowing the body to react will increase one’s body awareness.

End-gaining

Alexander called end-gaining “an orientation towards an end to be achieved, which distracts the person from the steps needed to achieve the end.”\textsuperscript{14} If one wants to change a habit by focusing on the end goal, such a specific end goal will control one’s attention and “the habitually muscles that perform such a goal will automatically be activated, so that…will result in a misuse of the organism.”\textsuperscript{15} For instance, one could practice long notes to improve sound quality and bow control focusing only on the sound itself being completely unaware of the movements within the body. Without realizing about the primary control, bow-hold, position of

\textsuperscript{12} Gelb, 68.

\textsuperscript{13} Ibid., 75.

\textsuperscript{14} Jones, 210.

\textsuperscript{15} Gelb, 80.
shoulders, movement from the arms, sitting position, way of breathing, etc., one will only misuse the body attempting to reach the desired goal.

Means-whereby

Alexander called means-whereby “the coordinated series of intermediate steps which must be accomplished in order to attain an end. The application of the means-whereby principle involves awareness of the conditions present, a reasoned consideration of their caused, inhibition of habitual or end-gaining responses to these conditions, and consciously guided performance of the indirect series of steps required to gain the end.”16

If a cellist wants to succeed in using his/her self well, he/she needs to be aware of the steps necessary to make any skill comfortable all the time. Considering these steps before and during a shift, for instance, he/she will have better chance to succeed. The cellist will have to be aware of state of the body such as the position of the shoulders, how free both thumbs, elbow, and shoulder are, etc., and that will allow him/her to realize why he/she is unable to make a shift correctly. If there is tension, pain, or an uncomfortable sensation, the cellist has to consider why tension is present. Then the cellist should inhibit usual and automatic responses from the body, then conscious directions can be given ordering the neck to relax, the head to go forward and up to lengthen and widen the back. At the same time the cellist should sense reactions from the body and let them happen. Applying this procedure to cello technique, one will have more elegant and balanced movements and better chances to succeed the end goal.

Use of Self

The use of self is the use of the body/mind in any kind of action, no matter how simple, small, complicated, or large. Therefore, the use of self is changeable all the time since we change

16 Jones, 211.
activities nearly every movement. However, in order to have a good use of the self, one must not interfere with the primary control. When one interferes, the inhibition and means-whereby may be applied to reestablish that connection, being aware of the use of self helps to avoid end-gaining and faulty sensory awareness.  

The Alexander Technique is not a relaxation technique; on the contrary, it is a way of living. When one applies the technique, he/she will realize and understand the relation of muscle length to muscle tension, and how a good balanced body performs an action. 

**Body Mapping**

Body mapping is a tool that can be used for any somatic study to develop and refine the kinesthetic sense, and will help understand both how the body works and the principles of means-whereby. William and Barbara Conable developed body mapping to give access to one’s “own body map, self-observation and self map to produce efficient, graceful and coordinated movement.” One can utilize the concepts of body mapping as redirections while he/she un-do unnecessary tension, by redirecting the body.

Heather Buchanan, specialist of body mapping for choral musicians, writes that body mapping is based on four main principles: cultivating an accurate and adequate body map; training movement; training the relevant senses; and training attention. To cultivate an accurate and adequate body map, one must understand the three elements that involve a body map: structure, function, and size. Buchanan explains that “structure refers to human anatomy,

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18 Ibid., 161.


20 Buchanan, 96.
predominantly the musculoskeletal system, although the nervous system is also important; function refers to physiology, the way anatomical structures interact to create movement; and size refers to the specific dimensions of the various muscles and bones involved.\(^{21}\) Good training movement will be developed if one does not have misconception or body mapping errors that create unbalanced or uncomfortable sensations. In addition body mapping will “cultivate inclusive attention as [musicians] systematically explore the relevant anatomical structures and physiological information of the body.”\(^{22}\) In order to understand body mapping, it will be helpful to refer to a skeletal diagram of the upper body (see Illustration 1).\(^{23}\)

Illustration 1. Bones of the upper body.

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\(^{21}\) Buchanan, 96–97.

\(^{22}\) Ibid., 97

For cellists, it is important to know that the structure of the upper body includes the thorax, neck, head, and abdominal cavities. The upper limbs are composed of the humerus, in the upper arm, and two bones of the forearm, “the radius on the thumb side of the hand and the ulna on the little finger side.” The hand is composed of “eight carpal bones for the wrist and five metacarpals and fourteen phalanges for the fingers.” In addition the upper limbs include four main joints: wrist, elbow, shoulder and collarbone-breastbone. All these four joints need to be free of tension in both arms, so they can function in a balanced way to let both hands have elegant movements. One of the most common mistakes among cellists is to believe that the bow-arm action involves only three joints without considering the collarbone-breastbone joint, creating stiff, uncoordinated movement throughout the upper body. The size of each part of the upper limbs has a function and mobility that they are made for, the smaller they are the more mobility they will have. For instance, the upper left limb will move along with the left hand while fingers will be in charge of the details to play the right pitches at a certain speed.

To apply body mapping, the cellist should first apply inhibition, give directions to the neck and back, and then he/she can redirect the body by body mapping the upper limbs. If the cellist wants to switch from one string to another with the bow, he/she can place the bow on the “a” string and shifting the bow to the “d,” “g” and “c” strings, he/she can see that the right shoulder and arm drop down to shift strings. The joint that actually makes able to have the right shoulder at different levels is the collarbone-breastbone joint. All joints need to be free for this

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25 Ibid., 105.


27 Ibid.
movement to occur organically, and it is imperative to have the collarbone-sternum joint free to make this movement as smooth as possible.

To go back from the “c” to “a” strings passing by the “g” and “d” strings, there is a combination of movement from different joints. The cellist needs to know that the lower arm has two bones, the radius and ulna, and they allow rotating the hand and lower arm. It is necessary to know that there are two movements of the lower arm called pronation and supination.28 Pronation or pronation-turn is an inward movement that involves the wrist, forearm, and upper arm. When one holds a cello bow and rotates at the wrist in an inward direction, to put more pressure on the bow (using the index finger), that is pronating. On the other hand, supination movement or supination-turn is a wrist outward movement to the left. As in pronation, supination also involves movement from the wrist, forearm, and upper arm.29 For instance, when one shifts the bow from the “c” to “g” string, he/she has to make a pronation-turn allowing the collarbone-sternum and shoulder joints to be free. The same process is needed obviously shifting from the “g” to “d” and from the “d” to “a” strings. Letting the joints move freely will allow a smooth change of strings and will help to keep a good contact point between the bow and strings. In addition, the weight of the right arm will remain on the bow without adjusting or trying to find it every time shifting from one string to another.

**Conscious Constructive Control**

Applying the Alexander Technique principles and using body mapping as an important tool will enable one to practice the conscious constructive control. The latter is a “constructive guidance in which an individual can apply, not just to the movement of specific muscles but to

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all sphere of mental and physical activity.”

In other words, conscious constructive control consists of the practice of means—whereby, the act of using self well and engaging the primary control. This guidance involves noticing, inhibiting/redirecting, and then allowing. First, one needs to notice or be aware that there is misuse or a bad habit, such as squeezing the bow with the right thumb. Then, one has to inhibit, stop the self from any accustomed reactions by allowing the body to react while simultaneously letting the neck “to be free to let the head go forward and up so the back may lengthen and widen,” and redirecting the right upper limb by body mapping each of its joints to improve its alignment with the hand, arm and upper body to find a better and more balanced way to hold the bow. Finally, it is necessary to allow the body reflexivity to connect with its’ primary control. This will organize and coordinate the body without the need to make these adjustments happen.

The muscles from the back, shoulder, and arm will apply weight on the bow to have a better use of the self. As a result, one will reeducate the body in a psycho-physical way to correct a bad habit.

**The Feldenkrais Method**

Moshe Feldenkrais (1904–1984) developed the Feldenkrais Method, a somatic educational system. He was born in Russia, and at fourteen he moved to Palestine where he studied mathematics and map production. During World War II, he worked for the British Admiralty and after the war, he returned to Israel. His interest in soccer and judo injured his knees, and unhappy with the medical solutions at the time, he started investigating his own

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31 Gelb, 68.

treatment options. He published several books and taught his method around the world. His legacy is the Feldenkrais Institute in Tel Aviv, Israel. The Feldenkrais Method is a “self-discovery of body awareness by using movement,” and like the Alexander Technique, its goal is to make any person be able to “perform with minimum effort and maximum efficiency.” There are two main components of this method, “awareness through movement that is the awareness to what one is doing that is intended, and functional integration that intends to integrate the being around a function” or action. In addition, the whole self must be involved all the time performing any function or action.

**Self-image**

Moshe Feldenkrais used to say “if you know what you are doing, you can do what you want.” He meant that in order to have any capacity to be aware, one has to consider self-image, which has to do with how one functions. The self-image is about how one behaves in life with the body internally and externally, “how one acts, perceives, senses, feels, how one makes meaning, and what one believes and values.” In addition, the self-image “controls how one does what one does rather than what one says about what one does.” By enhancing the self-image, one can have a great chance of the many possibilities to perform any action in different

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36 Ibid., 5.

37 Frances M. Bruce, “Making Sense in Movement: The Dynamics of Self-Learning and Self-Change” (PhD diss., Texas Woman’s University, 2003), 48.

38 Ibid., 47.

39 Ibid., 48.
ways that one can choose from, instead of having only one possibility. To correct any action, one must have a clear picture of how one is doing it. For instance, to make a good shift, a cellist needs to be aware and to know what he/she needs to let happen within the body to be able to enhance the self-image. He/she has to sense the joints that will be involve in that shift, perceive the state of both upper limbs, hands, and fingers before the shift, and feel the movement of the hands, fingers, and arms at the time of the shift and act or react by judging if the shift was successful or not.

Thus the self-image is based on the way one is aware of how one moves. Unfortunately, the self-image can be decreased at any time depending on attitude or behavior. If one pretends to have certain attitude, he/she can present the self in a certain way. At that moment, he/she will present an outward appearance, which is just a mask of the self-image. One can neither pose nor play nor pretend to be, for instance the greatest cellists in history. He/she will have to find his/hers self-image, observing how he/she wants to sound, finding his/her individual way of playing, and awakening the body awareness including the components of action.

Components of Action

During any action the whole self should be involved, and that can only be possible if the self-image is increased by including all the components of action: movement, sensation, feeling, and thought. Thinking involves being aware and having a mental preparation to make a movement. This mental preparation includes what movement is needed to perform a specific action and what one needs to feel during the movement. During an action, one needs to sense what it is heard, seen, and touched, and to feel the result of an action in order to judge the

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effectiveness of the movement. In case one or more of them is missing, the performance of a certain action will lack freedom. For instance, when one plays the cello these four components have to be incorporated in both hands; obviously the application of those components for the left hand is going to be different than for the right hand. One has to be able to feel how the state of the upper limbs are before, during, and after the movement, and listening for intonation and sound quality, sensing to the movement involved, and allowing elegant and balanced movements to happen. One will be able to use the whole self, meaning that all parts of the body must be included to perform an action.

**Consciousness and Awareness**

Feldenkrais believed that “there is an essential difference between consciousness and awareness.” To understand those differences, it is necessary to know that the brain works at different intellectual levels when one performs with either consciousness or awareness. The brain regulates all functions and activities with the limbic system, cerebral cortex, and forebrain. The limbic system is “one of the oldest parts of the brain and controls emotions, appetites, and areas that coordinate other basic biological functions that are symmetrical and well-integrated. They primarily utilize rapid serial connections between nerve fibers.” On the other hand, the “cerebral cortex and forebrain are the most developed parts of the brain and are asymmetrical, working one-tenth with the limbic system.” Consciousness is possible because of the slowness, asymmetry, and complexity of the forebrain and cerebral cortex. Also, “consciousness is characterized by language and symbolic capacities which enable [one] to orient or focus on

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42 Feldenkrais, 10–11.
43 Ibid., 50
44 Shafarman, 195.
45 Ibid.
events that are remote in time or space.” However, it “tends to narrow perceptions and excludes aspects of experience, limiting [the] ability to know [oneself] or modify [one’s] behavior.” For instance, when one performs an action in cello playing, it does not necessarily mean that the cellist knows what he/she is doing. Many times one either focuses on a particular goal or plays on automatic pilot using only the limbic system, with the brain working in the lowest intellectual level, and one does not think about the specific task and how it is done.

On the other hand, Feldenkrais considers that “the sequence to asleep to awake to conscious to aware” is part of human evolution; therefore, the “capacity for awareness evolved even more recently than consciousness.” When one is aware, the brain works on a higher and complex intellectual level because one lets the forebrain and cerebral cortex work with the limbic system, having the brain working on a higher intellectual level. Feldenkrais writes that “awareness is consciousness together with a realization of what is happening within it or of what is going on within [oneself] while [one] is conscious.” Frank Jones describes awareness as a “general unfocused condition in which a person is wide awake and alert to what he/she is doing without being concentrated on anything in particular.” Steven Shafarman, certified Feldenkrais practitioner and assistant trainer, mentions that “awareness links self and environment, inner experience with outer world, enabling one to be here, now, whole.” Craig Williamson, therapist and pioneer of Somatic Integration, claims that “awareness involves widening [the] scope of consciousness…allows [focusing] without any mental effort, while the mind allows a

46 Shafarman, 196.
47 Ibid.
48 Feldenkrais, 50.
49 Jones, 176.
50 Shafarman, 196.
flow of events to occur.”  

For instance, when a cellist is aware of the self, his/her scope of consciousness is alerted to many things that happen at the same time, such as the movement of the right arm, sound quality, bow hold, adjustment of weight to the bow, and breathing, which allows joints and muscles to be freed. By being aware, the cellist will be able to include the four components of action—movement, sensation, feeling and thought—and the whole self will be able to practice and perform on a high intellectual level.

**Yoga**

Yoga is the third and last somatic educational system that can help to refine the kinesthetic sense. It is known as a meditation in motion, incorporating breathings technique that can help clear the mind. According to W. Evan-Wentz, yoga is categorized in four groups: *hatha, karma, bhakta,* and *raja.* *Hata* focuses on “the general development of physical fitness and health,” and is divided in two important branches: *asana* and *pranayama.* *Asana* is defined as postures where “the body is stretched and bent without strain or pain,” holding and releasing the positions “to increase flexibility, improve circulation and stimulate organs and glands.” *Pranayama* is the yoga method of knowledge and control of breathing which expands the mind

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51 Williamson, 7.
52 Feldenkrais, 47–8.
and oxygenates and helps purifying the blood."\textsuperscript{55} Having conscious control of breathing will help to oxygenate muscles and joints to keep them untied and freed. For the purpose of this document, I will focus on \textit{pranayama}, or breathing techniques, in this chapter and an \textit{asana} position, mountain pose, in the following chapters.

During daily activities, one mainly uses the upper part of the lungs using less than 30\% of the lung capacity.\textsuperscript{56} \textit{Pranayama}, or breathing techniques, make use of the lungs to their maximum capacity because it involves abdominal breathing. Body mapping parts of the torso is essential to understand how any abdominal breathing works in yoga (see Illustration 2).\textsuperscript{57}

Illustration 2. Upper body and location of diaphragm.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{diagram.png}
\caption{Upper body and location of diaphragm.}
\end{figure}

\begin{itemize}
\item \textsuperscript{56} Ibid., 7.
\item \textsuperscript{57} Harter, 4, illus. 2.
\end{itemize}
The torso is divided into thoracic and abdominal cavities. In the thoracic cavity are the ribs, sternum, collarbones and upper part of the spine, and in the abdominal cavity are the pelvis and the lowest and thickest part of the spine. These two cavities are separated by a muscle with parachute shape called diaphragm that it is located under the lungs, supports the lungs and is responsible for 75% of muscular work during breathing. One is able to locate the diaphragm by putting one hand on the sternum and move it downwards until feel where the sternum ends.

**The Full Yogic Breath**

The full yogic breath or three-part *digha* breath is the foundational breath in *pranayama* and can be learned in three positions: lying down on the floor, sitting, or standing up. Practicing full yogic breath lying down on the floor is recommended because one does not have to worry about having a good sitting or standing position and one only has to focus on breathing. After the student feels comfortable with the lying down position, he/she can start working on the sitting position, which can be applied during cello playing. The student can take advantage of the standing position that can be practiced any time. This breathing technique involves areas of the upper body, belly, rib cage and collarbone and it is recommended to breathe in and out through the nose rather than with the mouth. A complete yogic breath will happen when the student is able to do all three stages consecutively; however, practicing them individually can also be very beneficial for playing.

The following exercise will result in the belly breathing, which involves the use of the lower part of the lungs. First, the teacher has to instruct the student to lie down in supine position with the hands resting on the belly, fingertips slightly touching, loosely interlaced, inhale and exhale slowly. During inhalation, the student will feel the belly expand, and every time he/she

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58 Conable, *How to Learn the Alexander Technique*, 69.

59 Olso, 12–13.
exhales will feel how the belly relaxes down towards the floor. When the student inhales, the lower part of the lungs pushes down the diaphragm and makes the belly expand. At exhalation the lungs give up pushing the diaphragm and the belly returns naturally to its previous position. The student will notice that the hands will separate when he/she inhales and will get back together when he/she exhales. The student will also notice the movement from the spine and ribs by placing both hands aside the belly. Now, the student should exhale and try to feel how the abdomen muscles will relax naturally and come back to their previous position.\(^{60}\)

The second part of three-part *digha* breath involves sensing the movement of the rib cage which houses the lungs. The teacher should instruct the student to place one hand on the belly and the other on the chest. The student should inhale and exhale filling up the main part of the lung not just the lower part as in belly breathing. After he/she fills up the lower part of the lungs, he/she has to keep breathing and try to feel how the rib cage expands to all directions front, sides, and back. Also the student should feel how the ribs expand stretching the spine during inhaling, and feel how they relax during exhalation. By practicing belly and rib cage breathing lying on the floor, the student will develop breathing awareness that will help when the breathing techniques are applied in sitting position. Also when the student practices these two breathing techniques in a sitting position, it will be easier, feel more comfortable, and he/she will be able to be aware how the upper body can move with ease and grace.\(^{61}\)

The third and last part of the full yogic breath is called collarbone breathing. After the student breathes and fills up the lungs by applying belly and rib cage breathing, he/she should try to fill up the upper part of the lungs. This will slightly move the collarbone. If the student wants to notice how the collarbones move, he/she should put both hands on them while he/she inhales

\(^{60}\) Olso, 13.

\(^{61}\) Ibid.
and exhales to feel how the collarbones lift up a little bit. This happens because the upper most part of the lungs is above the collarbone and move during breathing.\textsuperscript{62}

Now the student can consider that he/she has five ways of breathing. The first way is a daily way of breathing. The second, third and fourth ways are belly, rib cage and collarbone breathing. The last way is the full yogic breath which brings “the whole breathing system under conscious control, and encourages intense awareness of lungs and diaphragm.”\textsuperscript{63} The student can apply each way of breathing in cello playing according to his/her necessities and depending on the piece, its character and phrasing. For instance, if the student is about to play the first solo part of Antonin Dvořák’s Concerto for Violoncello in B minor, it will be helpful to do a full yogic breath several times before starting. The teacher has to show the student that he/she always plays the first note during exhalation. After the first measures the student has to be aware how and where he/she breathes, making sure to do ribcage breathing to be able to keep up the intensity desired for the first solo. On the other hand, if the student plays the first solo part of Joseph Haydn’s Cello Concerto in D major, he/she only needs to prepare his/her self by doing belly breathing because this solo is not as intense as the Dvořák’s.

**Kinesthetic Awareness**

To understand kinesthetic awareness, it is necessary to understand what happens with the body when it performs an activity in automatic mode. Leela C. Zion writes that during automatic mode “there are unconscious patterns that may be called into operation to execute the actions desired, stored in various areas of the brain…that are directed by the kinesthetic sense.” Unconsciously, the kinesthetic sense is always operating, and muscles, joints, and tendons learn

\textsuperscript{62} Olso, 14.

\textsuperscript{63} Herman, 13.
what to do to make a specific movement, even though one may or may not be aware of what is needed to do such a movement. \(^{64}\)

In daily life the kinesthetic sense works in automatic mode. For instance, when one is walking, “[the] brain uses all the available kinesthetic information to guide [the] movement” so that one does not need to think about how to walk. \(^{65}\) Also, breathing is an involuntary action in the neuromuscular system, an automatic process to keep one alive. One is able to do all of these activities because all the movements are deep-rooted in the neuromuscular system and in the kinesthetic sense, allow one able to live in an automatic mode.

On the other hand, one is able to consciously activate the kinesthetic sense to improve skill of movement by paying attention or being aware. \(^{66}\) Paying attention to movement will refine kinesthetic awareness, which will provide an extensive range of kinesthetic input, such as “balance, muscle effort, spatial orientation, and coordination…[which are] the foundation for movement awareness.” \(^{67}\) Michael J. Gelb, an Alexander Technique teacher, writes that paying attention “involves a balanced awareness of one self and one’s surroundings with an easy emphasis on whatever is particularly relevant at the moment.” \(^{68}\) Craig Williamson claims if one pays attention to what he/she feels during movement, the brain will receive more accurate information about what is happening, because “the better the kinesthetic awareness, the more stable, safe and relaxed” one will be during movement. \(^{69}\) Also, Alan Fraser, pianist and instructor

\(^{64}\) Leela C. Zion, “Making Sense: Kinesthesia,” *Et Cetera* 53 (Fall 1996): 308.

\(^{65}\) Williamson, 13.

\(^{66}\) Ibid., 14.

\(^{67}\) Ibid., 26.

\(^{68}\) Gelb, 75.

\(^{69}\) Williamson, 14.
of the Feldenkrais method, mentions that the more one is able to sense or feel, the more one knows what one is doing. In other words, “the richer the sensory information sent to the brain, the better basis one has for organizing movement.” Kinesthetic awareness can give a cellist the chance to choose from uncomfortable to comfortable movements and from unbalanced to balanced way of playing.

Any cellist should learn to connect kinesthesia with the other senses including hearing, sight, and touch to improve body awareness. Heather Buchanan writes that body mapping will help to engage kinesthesia with the senses and movement by “training attention [that] incorporates the ability to be more sensitive, discerning, and responsive to body movement in the musical context.” One will be able to refine movement and body and kinesthetic awareness by applying the sensitivity-discernment-responsiveness cycle. Barbara Conable shows that there might be two approaches to fix an out-of-tune note, by using the sense of hearing or by using both the hearing and kinesthetic senses. The first approach happens when one hears the note that one plays. Discerning what one plays, one hears the note is flat. As a response of one’s judgment, one brings the note back in tune. The second approach occurs when one plays a note, listens to that note out of tune, and kinesthetically senses the state of the body while playing. Discerning what one hears and senses, one is able to hear that the note is flat, and kinesthetically sense that the body is out of balance. As a reaction, one should bring one’s self back in balance, enabling one to play the note in tune. Through repetition, the neurological and muscular

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71 Buchanan, 97.

72 Ibid.
systems will work together, creating the necessary mapping, planning relationships, and movement patterns and storing them in the brain to make a successful and balanced movement.\textsuperscript{73}

Also, a cellist can refine kinesthesia by being aware of the body’s state and redirecting the body through body mapping. He/she can body-map the back, neck, and arm, and its joints and muscles, and imagine, for instance, picking up the bow and putting it on the string. After a cellist pictures placing the bow on the string, he/she should visualize moving the bow, along with the collarbone, shoulder blade, elbow, and right-hand move. He/she needs to imagine sensing that the shoulder and back move the bow so the arm and forearm follow the movement from the shoulder and bow-hand. Paying attention to the body parts involved in a movement may produce a change in muscle tone, realizing the state of those parts and allowing one to choose to engage all parts to perform eased and balanced movements. Gerhard Mantel, a cello teacher, writes that this might help the student to have a clear anticipatory sensation of the movement and what parts of the body will be involved, and a clear understanding of how the movement will have to be performed. The student will have a picture memory of this movement because the brain has sent electrical impulses through the nerve pathways, which prepared the limbs for their function or movement.\textsuperscript{74} Now he/she will be able to actually hold the bow, put it on the string, and play.

Being aware of this process, the student consciously uses the kinesthetic sense by thinking, feeling, sensing, imagining, and reacting while playing. As a result, the right upper limb will work with more balanced movements, and the student will be able to realize and judge what he/she has been doing either correctly or incorrectly. The student will also be aware of how to hold and move the bow, letting muscles and joints work together, and allowing the weight of

\textsuperscript{73} Williamson, 32–33.

the arm be on the bow. Therefore, bow direction will improve as well as sound projection and quality. Attention to awareness will help to keep the kinesthetic sense awaken that will open the student’s perspective on how to perform a movement in a balanced way. The student will be able to understand why an end goal fails and what it is necessary to correct or let go to have a successful movement.

**Kinesthesia and Constructive Rest**

Constructive rest is a tool of the Alexander Technique, which can be practiced in semi-supine position focusing on the kinesthetic sense. According to Lulu Sweigard, constructive rest “is a means of resting that aims to create more efficient posture.”[^75] One simply allows the body to realign itself the inside out. In the following exercise, one will concentrate on the full yogic breath to connect the body with the mind, understand how the kinesthetic sense works, and know how they work by practicing constructive rest.

The teacher will instruct the student to lie down on the back on the floor in semi-supine position in which the legs have to be bent; the feet do not have to be neither too far from the torso nor too close. He/she will need a book or several to support and align the head with the cervical spine. Once in this position, the student should pronate the arms; move the elbows out, away from the ribcage, and place them on the floor and let the hands rest on the belly.[^76] The student should start by inhibiting then giving directions to the neck, head, and back. Directions should continuously be given through the entire practice of constructive rest. The student may start to apply belly breathing and during every inhalation he/she should try to sense how the ribs expand, and during exhalation, the ribs return to their rest state. The student has to be aware that the spine also moves as he/she breathes. It gently shortens from the head to the tail as he/she


breathes in, and gently lengthens the head away from the tail as he/she exhales. All this will happen if the student is not holding tension and sensing without trying to force the body to do it. Also, when the student exhales and inhales, he/she needs to feel how the upper and lower back move and get more contact with the floor. At some point, he/she has to apply thorax or rib cage breathing, imaging on a specific part of the upper body and sensing how that part of the body moves when he/she inhales and exhales. For instance, when the student exhales, he/she might focus on the shoulders and sense how they get wider and get closer to floor. He/she might imagine that he/she exhales through the shoulders, and this will give a kind of extra stretch to them.

After practicing constructive rest for ten minutes, the student may notice that he/she does not feel as comfortable as when he/she started practicing it, and this happens because the shoulders are now closer to the floor, the neck is a little tighter, and he/she feels that a little adjustment within the body is needed. The teacher has to instruct the student that first, he/she is going to raise the right leg and place the right foot on the left knee, but before he/she proceeds, he/she needs to body-map the joints between the femur and the pelvic girdle, because the muscles from the upper right leg will actually move the leg and the foot will follow this movement. The student has to remember that all the joints from the legs and feet need to be free including joints from knee. If the student visualizes this process before he/she does it, he/she will realize that the more one practices the easier it is. Now the student has to place the right foot on the left knee during exhalation, and he/she will sense that the right side of the lower back gets a little stretch without doing any effort. The student should keep breathing and sense the position of the right foot on the left knee, the position of the back and neck. Now, the student has to think about putting the right foot back on the floor, to body-map, and to think about what part of the
body will lead this movement and what it will follow. After he/she places the right foot on the ground just like the other leg, he/she will sense an unbalanced lower back because the right half of the lower back has better alignment than the other, in fact the right side of the lower back will have more contact to the ground than the left one.

To align the unbalanced or unaligned left side from the lower back, the student will have to put the left foot on the right knee, but first, he/she needs to body-map exactly what it needs to be moved and think what part of the body will lead this movement. After the student places the left foot on the right knee and return it to the floor, he/she will feel a balanced lower back and be more comfortable than before. A variation of this exercise is placing one of the legs on the floor while the opposite knee stays bent, instead of placing one of the feet on the opposite knee.

The teacher should instruct the student how to align the head and neck with the rest of the spine. The student has to apply belly and rib cage breathing, body-map each vertebrae from the neck especially the first one that is under the skull, and finally start moving the eyes from one side to the other. At the time the student exhales, he/she will roll the neck slowly to the right side and sense how easy or difficult this movement is. He/she has to keep breathing in this position and sense how the neck and back feel in this position. Before the student rolls the neck back, he/she has to breathe several times and try to sense how all the gaps between the vertebrae stretch during exhaling, and body-map bones and joints that need to be free before he/she rolls the neck back. By practicing this exercise, the student will realize that the more he/she body-maps joints, bones, and muscles from the head, neck, and shoulders, the easier it becomes. To roll the head to the left side, he/she has to body-map everything needed to have a smooth movement. Last, the teacher should instruct the student to put both hands under skull to lift the head. The student has to consider that the head is heavy and the hands need to lift it up, avoiding
any tension in the neck and avoiding lifting the head with the neck. The student hands will be able to pick it up just a little, at the most one inch, to realign it with the rest of the spine.

The student can also align the thorax, which includes the shoulders and upper back. The student has to apply collarbone breathing, and he/she will be able to sense how the shoulders expand and have more contact with the floor. The student is about to lift up the right arm to the ceiling, and it is necessary to body-map its joints and bones to let this happen. Also, he/she should move the right arm to the left side over the body, including freeing the neck, back, and chest. Moving the right arm will include the shoulder blade, collarbone, and their joints by imaging that the back and upper arm will initiate the movement and push the hand, which will give direction to this movement. To do this, the student has to body-map the shoulder to engage the collarbone, its joints, sternum, shoulder blade, and every single bone and all the joints from the lower arm and hand. The student should move the right arm and sense how the neck reacts and how the back moves along with the shoulder letting the head follow the movement. The student has to allow the head roll to the left size following the hand and arm movement, also he/she has to let the hips move along with the upper body and legs; even his/her opposite arm that is not moving gets moved or pushed. The student needs to understand the importance of letting and including the whole self be involved in any movement.

After the student practices this exercise and returns and place both hands back on the belly, he/she will realize that the right side of the back is wider and the right shoulder has more contact with the floor. He/she will feel that the left size of the back is unbalanced because only one side seems to be wider and closer to the floor, which is the side that he/she just worked on. The student will have to practice the previous exercise moving the left arm to the right to align the left size of the back.
To finalize constructive rest, it is necessary to know how to stand up. While the student is lying down on the back with both knees bent, he/she has to lie on the left side placing the right palm on the floor initiating the movement from the shoulder including rolling the pelvis to the left side, until he/she finds his/her self facing the floor. The student has to lift the upper body with the arms and the hips with the legs to “come to the four-legged position with the weight on the hands and knees.” Before the student intends to stand up, he/she should imagine a straight string coming out from the top of the head. This imaginary string will pull the head up and will lead this movement to stand the student up. The legs will move the body up and will be responsible to stand it up by using the muscles from the legs and freeing their joints. The student has to be aware that neither the back nor the neck, nor the eyes are responsible to do this movement; they only follow the imaginary string while the legs pull the body up. The student must trust the legs that are stronger than he/she thinks.

The Alexander Technique, Feldenkrais Method, and yoga will help any cellist to awaken and develop the kinesthetic sense and body awareness. These somatic education systems will provide the necessary tools to understand what one needs to let happen within the body to create smooth and efficient movements. In addition, by awakening the kinesthetic sense, one will be able to evaluate, criticize, and have more confidence in movement to help develop as high level cellist and musician. Constructive rest position will help the student comprehend the importance of body mapping and yoga breathing techniques to awaken the kinesthetic awareness and apply it to cello playing to eliminate bad habits, which can cause one to be unbalanced and uncomfortable.

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Sweigard, 219.
Chapter III

The Kinesthetic Sense Applied to the Cellist Achieving Balance in the Playing Position

Having understood that somatic education systems will help to awaken, refine, and develop the kinesthetic sense, this chapter focuses on their application to the cellist’s sitting position. I take into account of the lack of information about the application of the kinesthetic sense in some descriptions of the cellist’s sitting position. Also, I include a detailed explanation about how the center and line of gravity and mechanical balance work in the cellist’s sitting position. Finally, I include a detailed description of awareness through movement lessons to awaken the kinesthetic sense and its use in the cellist’s sitting position.

Descriptions of the Cellist’s Sitting Position

When a cello teacher explains the sitting position, the student gets a very general idea of it without considering any application of either kinesthesia or body awareness, which could apply during playing and performance. In general, most explanations about the sitting position either give a detailed explanation about how the cello fits the body or mention briefly the use of balance in the body without considering what happens with the body once the student starts playing. For instance, Maurice Eisenberg, cello teacher, explains the sitting position in a very traditional way, mentioning that “the feet should be planted firmly on the ground as shoulders thrown back. The end pin has to be adjusted according to the stature of the player and the height of the chair. The support of the body weight should be divided between the soles of the feet and the seat of the chair. It is advisable to sit fairly far forward, as this will enable the upper part of the body to remain reasonably upright even when the higher registers are used.”¹ Louis Porter,

¹ Maurice Eisenberg, Cello Method of Today, 5th ed. (Borough Green, UK: Novello, 1983), 1.
cello teacher, gives a detailed description about the sitting position explaining how the instrument should be held and how the position of the body should be, without taking in consideration what happens with your body while you play. Conversely, Victor Sazer suggests placing the cello on the left side of the body so one can have more control to the instrument, avoiding less twisting by having a broad base, and opening the legs more than usual. Also, he mentions that with this position the bow arm is less cramped, and the cellist does not “have to reach as far to the right to use the upper part of the bow.” However, he does not consider kinesthetic awareness in his description of the sitting position.

Elizabeth Morrow gives more in-depth reasoning, considering the use of balance and comfort in the sitting position. She explains that “the mass of [the] torso needs to be balanced appropriately over the sitting bones and both feet…using a gentle swaying motion, first forward and backward, and then side to side, imagining the body as a pendulum, gradually winding down to find its point of equilibrium, or balance.” However, in order to awaken the kinesthetic sense in the sitting position, one needs more than a description about it.

**Center and Line of Gravity in the Cellist’s Sitting Position**

The sitting position is not a fixed position in which a cellist can not disconnect him/herself from being aware what the whole body does during playing. Many times a student feels comfortable with the sitting position after some months of playing and he/she usually does not hear about it again. Normally, an advanced cellist does not think about the sitting position, and in case of any discomfort in either of the hands, he/she believes that working on one of the

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hands, they can solve a certain problem. Very often this kind of problems is due to a faulty sitting position, lack of body awareness, and failure to apply the kinesthetic sense. It is important to consider that cello playing is an aerobic activity, in which good balanced movements and breathing awareness are necessary for a good use of the whole self. In order to explain this, it will be helpful to body-map the pelvic girdle and consider the function of the center and line of gravity.

The pelvic girdle has the following bones: sacrum, acetabulum, ischial tuberosity or seat bones, ilium, ischium, and pubis (see Illustration 3). The last three are fused to form the front and sides of the pelvis, and the acetabulum is where the femur bone heads articulate.

Illustration 3. Pelvic girdle.

According to Lulu E. Sweigard, pioneer of ideokinetcs, the center of gravity in the human body “is an imaginary point about which all parts exactly balance each other; it is that point from which a body can be suspended in any orientation without tending to rotate.” It is

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6 Morrow, 31–32.
located approximately in the pelvis “just in front of the upper part of the sacrum at about 55% of the height of the individual.” In the cello sitting position, the center of gravity mostly stays in the abdominal area and works together with the line of gravity or the line of weight, which is a “vertical line which passes through the center of gravity,” from the top of the head all the way down to the floor. The line of gravity can also “be considered as the vertical axis of a structure.”

In the sitting position, the center of gravity is located in the pelvis and the weight of the body should be equally distributed in the sitting bones. The line of gravity passes through the sitting bones and coccyx or tailbone, and it will constantly move, having a “posture that is never static… and it is always resilient and flexible.” To understand how the line and center of gravity work in the sitting position, it is necessary to be aware of pelvic movements and adjustments that happen to balance and align the upper body during cello playing. Sensing the center and line of gravity, one will realize that they work together along with the pelvis, which constantly moves and rotates during playing. A student will be able to avoid unnecessary tensions that can affect his/her playing by being aware of a movable pelvis and its relation with the center and line of gravity. The student will be able to have good balance and alignment in the upper body by sensing the center and line of gravity, and being able to use the whole self before, during and after playing. Some cellist are aware of this concept naturally, but others figure it out after years of practice, and sadly there are some who never get it presenting lack of equilibrium, tension in the back and shoulders, incorrect spine rotation, and slouched back.

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8 Ibid.


Mechanical Balance and the Cellist’s Sitting Position

To figure out how the center and line of gravity work in cello playing, it is necessary to know how the weight of the upper body is balanced on the pelvis in the sitting position by understanding the mechanical balance concept. “Mechanical balance exists when the arrangement of the weight of the structure itself is such that stable equilibrium is maintained without outside help.”\(^{11}\) By understanding the mechanical balance concept, one needs to realize that the kinesthetic sense has to be awakened all the time to get a balanced upper body, and to enable a sense of the center and line of gravity. The mechanical balance increases stability by applying the following: 1) “The distribution of [the] body weight needs to have a good base support,” 2) An “equal distribution of weight around, and as close to, the line of gravity as possible,” 3) “The line of gravity has to be centered in its base by being aware of [the] center of gravity,” and 4) Finally, “weight has to be as centered to the base as possible.”\(^{12}\) Applying the mechanical balance concept in the sitting position, I can conclude that 1) It is necessary to use a chair with a flat seat, parallel to the floor to support the weight of the body, 2) Sitting with the seat bones at the edge of the chair, would allow a good balance with the pelvis and legs, 3) Sensing the line of gravity, the pelvis will be allowed to rotate, move forward, back, and sideways, so the line and the center of gravity and pelvis will work altogether, avoiding getting unnecessary tensions, and 4) Finally, being able to have a movable, flexible, and awakened pelvis, the weight of the body will remain in the pelvis. However, if one allows the back to get tense, the weight coming down from the head to the pelvis will create tension in the back and cause pain or discomfort in shoulders, neck, arms, back, etc.

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\(^{11}\) Sweigard, 18.

\(^{12}\) Ibid.
Any cellist needs to have a good mechanical balance, and it is important to be aware of the power that one can get from the pelvis because it “is the center of control of movement” in the sitting position. Being aware of the pelvis will allow a cellist to have a strong foundation and a solid mechanical balance to maintain a stable equilibrium during playing.¹³

When a cellist is aware of the way he/she sits, the center and line of gravity and the mechanical balance work properly, awakening and refining the kinesthetic sense, thus improving balance from the upper body and enabling smooth movements during playing. For instance, if a cellist has a stronger sound in the cello’s low register than in the high register, he/she might have a more comfortable cello sitting position when he/she plays in the low register than in the high register. When he/she plays in the high register, he/she should understand that the center and line of gravity change and move in relation with the position of the body. The line and center of gravity can not be the same in the low register as in the high register, and he/she needs to realize that the pelvis moves depending on what string is being played at that time. Since the pelvis and upper body move all the time, the center and line of gravity will continuously change. Some of the factors responsible for the changes can be register, volume, use of a specific string, speed of the bow, bowing, articulation, etc.

Feldenkrais’s awareness through movement lessons, body mapping and yoga will help any cello student to be conscious about pelvis movements in the sitting position. The student will create new mapping and planning relationships related to cello playing that he/she will be able to apply and sense in a specific action. The student will have a conscious application of the kinesthetic sense that will help make a smooth and more balanced movement during playing.

¹³ Sweigard, 31.
Awareness-through-Movement Lessons

The following two awareness-through-movement lessons of Samuel H. Nelson and Elizabeth Blades-Zeller, will help any cellist learn and understand that the pelvis is the source of power, balance, and equilibrium in the sitting position. These lessons will help a cellist understand how to sit in a balanced position, how to sense the center and line of gravity, and how to have a flexible and aligned pelvis during sitting and playing. To get the most out of these lessons it is recommended to practice them without the instrument because it will be easier to make movements correctly.

First lesson

In this first lesson, the student will learn that the pelvis is movable all the time in the sitting position, and the student will realize that when he/she is able to move the pelvis, the upper body will react and move along with the pelvis.

The teacher should instruct the student to sit at the edge of a chair with a flat seat and parallel to the floor, without the instrument. The student should breathe several times, applying the belly, thorax, and collarbone breathing for a couple of minutes. While the student is breathing, he/she has to body-map the pelvis and shoulder girdle, spine, and thorax, and switch to belly breathing. Now, he/she is going to “move [the] left knee forward a little and back to neutral position.” The student has to be aware that this movement has to “happen from [the] hip instead from [the] knee.” At the time the knee moved, the student needs to “allow [the] head, shoulders, and eyes to be moved along with the movement from [the] hip and knee.” The student should repeat this exercise several times and make sure it happens when he/she exhales.

14 Nelson, 68.
15 Ibid.
16 Ibid.
Now, the student has to “put [the] right hand on [the] right knee and [the] left hand on the side of the chair,” between him/her and the rest of the chair. He/she will have to “move [the] right knee forward and back…allowing [the] chest, head, and eyes to move when he/she exhales.”\textsuperscript{17} The student has to repeat the first exercise, moving the right knee forward and back. Also, he/she will have to try the second exercise, having the left hand on his/hers left knee with the right hand on the chair and move the left knee forward.\textsuperscript{18}

The student might notice while doing this exercise that he/she needs to let the upper body sit more erect to feel more comfortable, feeling the head more on the top of the spine. It is important to be aware that every time he/she moves the knee forward, the body is rocking on the sitting bones, making this movement smoothly and allowing the upper body to align with the pelvis.

Now, the student has to “put [the] right hand on [the] right knee and left hand on [the] left knee.”\textsuperscript{19} Also, he/she should “move [the] left knee forward and pause in that position, then move [the] head only back to the neutral position first and then the left knee.”\textsuperscript{20} The student might feel after several repetitions how he/she has to adjust the head to be more aligned with the spine. Also, the same exercise can be done with the right knee. The student will again have to place the left hand on the left knee and the right hand on the right knee and alternate moving the knees forward, allowing the head to follow the movement. Now he/she has to “fix [the] eyes on a spot in front of him/her…keeping [the] eyes and head in the center,” and move the knees forward.

\textsuperscript{17} Nelson, 69.
\textsuperscript{18} Ibid.
\textsuperscript{19} Ibid., 70.
\textsuperscript{20} Ibid.
alternately. Notice that this exercise can be uncomfortable because fixing the head in one position without allowing it to move makes tension and pain. This is an example of when one does not include the whole self for an action, and this happens frequently with any part of the body when one plays without a good use of self, which will cause pain and discomfort.

To finish this lesson, the teacher has to instruct the student to move the left knee forward as far as possible. The student has to keep moving the left knee forward to the point that he/she is about to twist the back. He/she has to keep moving it forward at the point where the left sitting bone slides out of the chair and the right sitting bone is the only contact with the chair. Now, he/she has to go back to the neutral position moving the body back from the pelvis. The student might notice that he/she did not have to twist the spine. He/she never stop moving the spine, and it was always working with the line of gravity. The pelvis worked with the center and line of gravity, the legs allowed him/her to balance all the time, and the right sitting bone was the only contact with the chair. The center of gravity stayed in the pelvis and the line of gravity rotated along the body when he/she moved one of the knees forward, and the upper body’s weight stayed in the pelvis.

**Second Lesson**

In this lesson the student will learn the importance of body mapping and the relation between the head, spine, and pelvis. Also, he/she will understand that the center of gravity will adjust when the pelvis moves in any direction such as forward and back, and the line of gravity will move depending on the pelvis movement awareness. This pelvis awareness will help to understand that one needs to let the pelvis move, rotate, and rock depending on the action at that moment. Awakening the kinesthetic sense in the pelvis, the student will realize the importance of having the head aligned at the top of the spine. The student should be able to body-map the point

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21 Nelson, 70.
where the base of the skull and the spine meet known as atlas-occiput joint or head-spine joint.\textsuperscript{22} Actually, the base of the head, the top of the spine, and the line of gravity meet at this joint. To realize this joint, the student needs to think about the front end of the nose and trace a vertical line from the nose through the back of the head. This line will pass across to the line of gravity and the space between the spine and base of skull. Imagining this relation, head, spine, and the line of gravity, will help align the head at the top of the spine.

The teacher should instruct the student to sit at the edge of a chair, keeping the hands aside, and applying belly breathing. The student is going to raise the right hip slightly by putting weight down through the left buttock. He/she should try that several times, and now raise the left hip slightly by putting weight down through the right buttock. Remember that this movement comes from the pelvis and not from the feet. Now, the teacher should instruct the student to go back to the neutral position, apply thorax breathing, and body-map the spine, neck, base of the skull, and pelvis. Slowly, the student should rock the pelvis forward, arching the back as he/she tilts the head upward, and comes back to the neutral position. The student should remember that the pelvis leads the movement back to the neutral position. The line of gravity will move to keep the body balanced in relation with the pelvis and head, while the feet help stay on the chair avoiding a fall. The student should repeat this exercise several times till he/she feels comfortable, and be aware of how his/her sitting bones rock, sensing and feeling how the back and head just follow the pelvis’s movement.\textsuperscript{23}


\textsuperscript{23} Nelson, 119.
Now, the student “should round the back and look down with the head making a letter “c” shape with [the] neck and back leading the movement with [the] pelvis slowly.” The student has to come back to the neutral position, leading the movement with the pelvis, so the back and neck follow the movement. Now, the student has to apply belly breathing two or three times, and move the pelvis forward while arching the back, inhaling when he/she is in the neutral position and exhaling when these movements are made. The teacher has to instruct the student to keep applying belly breathing and make a letter “c” shape with the back and head, then come back to the neutral position. Last, the student can also try to inhale while moving the pelvis forward to make a letter “c” shape with the back, and he/she will realize that breathing will be very difficult. This happens because one does not allow the lungs and belly to expand, and the diaphragm to move. This is an example of what happens when one slouches, tries to breath, and plays the cello. Muscles will not get enough oxygen, creating tension in the back and causing an uncomfortable sitting position that can produce pain.

**The Cellist’s Sitting Position: The Movable Pelvis in String Crossing**

At this point the student is more aware of the sitting position, and it is time to place the cello in front. The intention of this section is to awaken the kinesthetic sense and body awareness so the student will realize how the body gets balanced in the sitting position. For that reason, one must consider body awareness while he/she fits the cello against the body. The way one places the cello against the body is as follows: the student has to sit at the edge of a chair with a flat seat using the sitting bones and pelvis to support the upper body. He/she has to place his/her feet on the ground, body-map the pelvis and spine, and sense the line and center of gravity and the joint between the head and spine. Also, the student has to let the upper part of the cello rest on the

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24 Nelson, 120.
chest, and the cello’s lower left rib in the inner part of the left knee. Or, if it is desired the cello’s lower left rib can rest on the left knee. Finally, the student has to apply full yogic breathing to align the body. Now, the student is ready to apply awareness through movement lessons with the cello in place to realize how the whole body moves and how the kinesthetic sense works in the cellist’s sitting position.

In the following awareness-through-movement lessons with the cello the teacher should instruct the student to sit on a chair, place the cello against the chest, apply full yogic breathing, and realize how the cello moves as well when the thorax expands. Also, the student has to body-map the pelvis, spine, and diaphragm, and sense the line and center of gravity and the relationship of the head, neck, and spine. The student should try to do the first awareness-through-movement lesson explained earlier, moving the knees forward alternately and keeping the hands aside. The student has to pay attention to the body’s flexibility and movability. Since the cello will move along with the body, the student should let the head move in reaction to the body movements. He/she should keep doing this exercise and apply belly breathing, allowing the head, neck, and torso move along with the body. The student should practice moving the pelvis forward to arch the back and neck; exhaling when he/she starts moving, and coming back to the neutral position. Now, he/she should curve the back and neck, starting the movement from the pelvis. The student will realize that he/she is not going to be able to curve so much because of the cello, but he/she will be aware of the room that the pelvis has when it is moved.

As mentioned above, the cellist’s sitting position is not a fixed position. Its foundation is a movable pelvis aligned with an upper body that adjusts and moves all the time, while the legs and feet stay in contact with the ground to help maintain balance. According to Lee Fiser, cello professor at the University of Cincinnati’s College-Conservatory of Music, when a student plays
on the “a” string in the low register position, it will be necessary “to allow the torso to rotate to get the most efficient angle…this goes for all four strings, but it is most pronounced on the “a” string.” Therefore, the line of gravity and pelvis will move and rotate depending on the direction of the bow and what string is played at that moment. The student needs to realize that the pelvis and upper body have four basic positions for each cello string. First, the student should look straight ahead and then to the cello bridge; that position will be the neutral position of the upper body in cello playing. The neutral position can be for either the “d” or “g” strings depending of the proportions of the body. Consider that the upper body neutral position is when one places the bow on the “g” string, on the “c” string as position no. 2, on the “d” string as position no. 3, and on the “a” string as position no. 4. To understand how the pelvis and upper body are involved in these string positions, it is important to know what happens to the pelvis when one switches the bow from one string to another. Placing the bow on the “g” string and switching it to the “c” string, the pelvis and upper body will move to the right side, from the “g” to “d” strings, the pelvis and upper body will move or rotate to left side, and from the “g” to “a” strings they will move even more to the left side.

The teacher should instruct the student that in order to have a clearer sensation of what he/she should feel and sense, the student should pick the bow up and place it on the “g” string. The student should remember that the goal is to include the whole self, avoiding any unnecessary tensions in the upper body. To understand the concept of the movable pelvis, the student has to focus on awareness and movements from the upper body without considering the upper limbs for now. If the bow is on the “g” string and the student wants to switch it to the “c” string, the student needs to move or rotate the upper body (from pelvis to head) a little bit to the right side.

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by moving the left knee forward; the upper body will rotate to the right side, keeping the line and center of gravity aligned with the upper body. Now, the student can switch the bow back to the “g” string position by moving the left knee forward. Once the bow is on the “g” string, the student should switch it to the “a” string, moving the upper body from the pelvis by moving the right knee forward. The student can now return the bow to the “g” string by moving the left knee forward and switch it to the “d” string by moving the right knee forward, and he/she will see that the right knee does not have to move as much as to the “a” string. Last, the student should go back to the “g” string position by moving the left knee forward.

The teacher should instruct the student to switch the bow from the “c” to the “a” string, but first he/she has to body-map the pelvis, upper body, neck, etc., including the meeting point between the base of the skull and spine. He/she will have to sense the movement from the right knee moving forward while the bow is still on the “c” string. He/she will move the right knee forward, keeping the bow on the “c” string, and feel if the body is free of tension and how the body reacts from the movement of the right knee. The student will have to go back to the “c” string position and move the right knee forward and switch the bow to the “a” string keeping the bow on the stings. The student should feel how the body follows the movement that starts in the pelvis. To go back from the “a” string to the “c” string, he/she should sense and move the left knee forward, keeping the bow on the “a” string. Remember that the body has to follow the movements from the pelvis. The teacher should instruct the student to return the right knee and upper body to the “a” string position and move the left knee forward and switch the bow to the “c” string. Remember that one should sense and move the knees forward, considering the relationship of the head, neck, and spine, imagining the straight line that crosses from the nose through the back of the neck, to picture the head at the top of the spine.
I need to clarify that the last exercise, moving the knees forward, is an exercise to develop the kinesthetic awareness in the pelvis. The student should not intend to move the pelvis and knees every time he/she switches strings, but he/she needs to imagine and sense these movements to be able to have a movable pelvis. When the student switches the bow, for instance from the “g” to “d” strings, the pelvis will move subtly. However, if he/she switches the bow from the “a” to “c” strings, the pelvis will move noticeably since the movement from the pelvis will be part of the action from the bow. If one is aware and allows the pelvis to move, it will happen. If the student knows that the pelvis pushes the knee forward, the body will respond and rotate depending on what string is played.

The Cellist’s Sitting Position: The Movable Pelvis and Left Hand Shifting Action

In this section, the student will understand how the pelvis moves or rocks forward and back when the left hand switches from one position to another.\(^{26}\) For many cellists, the cello’s fingerboard fourth position is the most comfortable to play, depending on the dimensions of the body, the length of the arms, hands, and back, how tall or short the person is, and where the cello is placed against the body. The teacher should instruct the student to place the left hand in the fourth position, which is considered to be the neutral position for the arm and the pelvis. This neutral position is when the left hand is placed in the fingerboard without adjusting the line of gravity or the pelvis. For now, the student will focus on how the pelvis moves when the left hand travels along the fingerboard, either from low to high register or from high to low register. Meanwhile, the right hand is not doing anything. The student should place the left hand on the “d” string fourth position. Now, he/she is going to slide the left hand towards the bridge, but first body-map the shoulder joints, back, and pelvis. All the joints and muscles from the back have to be free, so the arm will be free to move and the hand will follow the movement. Now, the student

\(^{26}\) Conable, *How to Learn the Alexander Technique*, 47.
should slide the hand towards the bridge and feel that the pelvis is also involved in the movement. He/she should not try to move the pelvis forward at first, but let it be part of the movement. Approximately when the right hand is passing by the “d” harmonic (thumb position), the student will have to let the pelvis move forward by moving the left knee forward, to keep a nice balance between the center and line of gravity, head, neck, and spine. Allowing the pelvis to move is important because the center of gravity changes when the left hand moves towards the bridge, and in order to have a comfortable playing thumb position, he/she needs to adjust the line of gravity with the center of gravity. If the student does not allow the pelvis move, the back will start getting tense along with the neck and shoulder, corrupting any alignment or balance that he/she might have attained previously. He/she can imagine and sense that at the time he/she moves the left hand towards the bridge, his/hers left knee moves forward. The student will not move the knee, but by imagining that the student will let it happen and will awaken the kinesthetic sense from the pelvis. Finally, to return the left hand from the bridge to the fourth position, the student should body-map everything that it is going to be involved in this action, and sense the center and line of gravity. The student can start moving the left hand back to the fourth position and sense how the right knee moves forward while the pelvis is also involved in this movement. Before the left hand passes the “d” harmonic (thumb position) allow the pelvis move back to include it in this action as well.

A balanced sitting position is the foundation and source of movement in cello playing, and somatic studies are the medium to awaken the kinesthetic sense, helping the body to perform smooth and balanced movements. Understanding how the line and center of gravity and mechanical balance work together with the pelvis in the sitting position, cellists will be able to apply awareness-through-movement lessons. The latter will facilitate refinement of the
kinesthetic sense in the pelvis and the realization that a movable pelvis is the foundation of good, balanced, and smooth movements in cello playing. By sensing movements and the reaction of the body, the player does not have to be aware of joints, muscles, and bones by themselves or to focus on a single point. Instead, the cellist will realize that all movements and their reactions happen as part of an entire flow of motion in the whole body as means of how motions are related to cello playing.
Chapter IV

The Application of the Kinesthetic Sense on the Cellist’s Bow-Arm

In the previous chapter I explained that a balanced sitting position is the foundation in cello playing. In this chapter I will focus on the application of the kinesthetic sense to the cellist’s bow-arm, including an explanation of the upper limb’s anatomy for body mapping, and the semi-mountain pose for alignment and breathing exercises. Also, I will incorporate exercises to develop sensing and feeling weight from the right upper limb to the bow and string, an explanation about the function and use of the flexible right thumb, exercises to awaken kinesthesia on the right upper limb, and the application of kinesthesia playing down and up-bow.

Anatomy of the Upper Limbs

In order to know how one can apply the kinesthetic sense in the right arm or bow-arm and left arm or fingerboard-arm, it is important to know the components of the shoulder girdle, arm, forearm, and hand. The shoulder girdle is composed of two shoulder blades and two collarbones. The latter is attached to one end of the sternum and at the other end to the shoulder blade, which is attached to the back ribs by muscles. The arm is composed of the humerus, in the upper arm, and two bones of the forearm, “the radius on the thumb side of the hand and the ulna on the little finger side.”¹ The hand is composed of “eight carpal bones for the wrist and five metacarpals and fourteen phalanges for the fingers”² (see Illustration 4).³

² Ibid., 105.
The upper limbs are attached to the thoracic cavity and include four main joints, which are the wrist, elbow, shoulder, and collarbone-breastbone. It is important to understand how these joints allow certain movements. The collarbone-sternum joint allows limited movement of the collarbone in all directions, such as up-down movement of the shoulder girdle and forward-backward movement. The shoulder is formed by two joints the shoulder blade-collarbone or acromioclavicular and the humerus-shoulder blade or glenohumeral joints. The shoulder blade-collarbone or acromioclavicular allows gliding and rotation of the upper-limbs, and the humerus-shoulder blade or glenohumeral allows moving the arm in all directions. The pronation and supination movements are possible because of the hand’s rotation movement and the movement
of the ulna and radius, which are attached to the humerus forming the elbow joint. Finally the wrist joint makes it possible to move the hand in all directions.⁴

It is important to know the anatomy of the upper limbs to understand that any movement from the limbs or fingers in cello playing will “initiate at the shoulder girdle and its progress through successive joints to the finger tips.”⁵ For this reason conscious body awareness and good alignment from the upper body will allow the joints to be free during playing, allowing muscles and gravity to do the work. This is very important because “when the alignment of the spine and the shoulder girdle is balanced, the arms hang along the side of the torso without the need to hold the arms.”⁶ The relation between spine, waist, and shoulders is important since “the shoulder girdle depends on the alignment of the upper spine for its own balance, the muscles of the waist end up determining the alignment of the shoulders.”⁷ Therefore, if the shoulder blade and shoulder joint are tense, this will affect the function of the arms and hands because their function depends on the freedom of the shoulder girdle joints.⁸ Unfortunately, sometimes a cellist suffers pain during playing because of a lack of body awareness and alignment, and as a result he/she compensates for the lack of body awareness and alignment by having the joints do the work. The cellist has to be aware that when he/she attempts to learn something or learn to do something, it is necessary to have “satisfactory direction and control of the psycho-physical mechanism,

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⁴ Sweigard, 107–8.
⁵ Ibid., 108–9.
⁶ Craig Williamson, Muscular Retraining for Pain-free Living (Boston: Trumpeter, 2007), 101.
⁷ Ibid., 101–2.
⁸ Ibid., 102.
which are engaged in the acts of learning or learning to do something.”

The student has to know and to be aware of, and understand what needs to be done to include his/hers whole self during performance. The cellist will have to be aware of the kinesthetic sense, knowing what to think, body-map, sense, and feel to have the best-balanced movement.

**The Semi-mountain Pose**

In the previous chapter, I discussed the importance of the movable pelvis in the cellist’s sitting position. Now, it is time to understand how one can align the shoulder girdle with the upper body. The following exercise can be done with or without the instrument, and it will help the student to understand how both shoulder girdles align to the back, and how the back works with the line and center of gravity, including the relationship between the head, spine and pelvis. The teacher should instruct the student to sit on a chair with or without cello and to apply full yogic breath, and to align the head at the top of the spine as it was explained in the previous chapter. It is important that the student gets the center and line of gravity aligned with the body, including balancing the head at the top of the spine while applying full yogic breath. The teacher will introduce the student to the semi-mountain position, in which the student will realize where the shoulders should be, and full yogic breath will teach the student how the shoulders align with the back. First, the student has to let his/her upper limbs to hang on the side, second lift both arms to the side about 5-10 inches and finally rotate the palms so they face forward. All these three steps will “automatically open the shoulder and the chest.” Now, the student has to practice this pose and apply full yogic breath at the same time. When the student inhales, he/she

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11 Ibid.
may imagine that joints, discs from the spine, etc., get full of air, just like a balloon. Also the student should realize how the pelvis supports all the upper body with the location of the head right at the top of the spine. When the student exhales, he/she may imagine that the air gets out through every single joint, discs from the spine, shoulder joints and sense how the body reacts. As a result the student will be aware of the position of the shoulders while he/she is doing this exercise. Also during exhaling, the student might imagine that the air goes out through the top of the head and the bottom of the pelvis. The final purpose of the exercise is to awaken the kinesthetic sense and recognize the state of the upper limbs, and abdominal and thoracic cavities. After sensing, imaging, and practicing, the student will realize what part of the body is tense, or needs to be adjusted, or what joints needs to be freer or let go. When the student feels that the arms and shoulders are aligned with the back, he/she will realize that the application of full yogic breath is easier and understand the bad effects related to tension, for instance, when one tries to play cello tensing the neck, back, and buttocks, including a round back and caving the chest, the body is unable to perform balanced movements.\textsuperscript{12}

The Bow-hand: Sensing the Weight from the Upper Right Limb on the Bow and String

Since the main intention of this chapter is to awaken the kinesthetic sense in the right upper limb, a detailed explanation of how to hold the bow would be inappropriate. There are several ways to hold the bow depending on technique, level, physical dimensions or proportions, weight of the bow stick, etc. The application and awakening of kinesthesia are more relevant than the bow-hold itself. Explaining how to hold a cello bow would not help one be aware of what happens when the bow is on the string and what one should sense and feel when the bow is in movement.

\textsuperscript{12} Olso, 44–47
First, it is necessary to understand that the movement of the right arm or bow-arm is “like a machine of levers that moves…from the shoulder.”\textsuperscript{13} The whole arm is set in motion all the time no matter how short or long a stroke is. One has always to remember to swing “the whole arm as a unity, which is the end and the aim of all practice.”\textsuperscript{14} This movement involves free and smooth use of all muscles and joints from the collarbone-sternum joint to the last phalanges in the fingers. Emil Krall, cellist and cello teacher, writes that “it is the upper arm that lead and the whole system of levers must, and is bound to, follow the movement of the upper arm.”\textsuperscript{15} In case of the right hand, it will hold the bow and will play an important role as the contact point between the bow and string.

In addition, it is important to consider the right hand fingers’ behavior and function. The right thumb has to remain passive all the time because while the bow remains on the frog, the right thumb “keeps the stick from tipping towards the string,…regulates bow stability—and do so with virtually no pressure.”\textsuperscript{16} The index finger gets most of the right arm weight to create the contact point between the hand, the bow, and the string; and the fourth finger counter-balances the weight of the bow tip while at the frog.\textsuperscript{17} When the bow is at the frog, one should mainly pay attention to sense the contact point of the index finger, bow, and string. The index finger functions as a connector of weight and source of control between the stick and the arm. Then, it will be easier to sense the state of the thumb and the rest of the fingers. So the right hand and the

\textsuperscript{13} Emil Krall, \textit{The Art of Tone-Production on the Violoncello}, 3rd ed. (New York: Charles Scribner’s Sons, 1923), 19.

\textsuperscript{14} Ibid.

\textsuperscript{15} Ibid.

\textsuperscript{16} Elizabeth Morrow, “A Question of Balance,” \textit{American String Teacher} 57, no.1 (February 2007): 57

\textsuperscript{17} Ibid., 58.
whole arm have to rest or sit on the bow allowing the weight of the arm and shoulder girdle to flow through the arm, hand, and bow.

Most of the time, a beginner learns how to hold the bow very fast. Holding it is not complicated especially if the student holds the bow in vertical position. However, when the student places the bow on the string, the teacher should ask the student to allow the weight of the right arm rest on the bow. Once in this position, the following exercises will help awaken the kinesthetic sense in the right arm. The first part of the first exercise will help to apply weight from the right arm to the cello bow, and the second part of the first exercise the student will learn to find a balance point from the right arm in different parts of the bow.

In the first part of the first exercise, the teacher should instruct the student to place the bow on any string close to the frog, preferably either the “d” or “g” strings. The student will have to keep the bow on the string while the left hand holds the bow at the middle part. The teacher will ask the student to let the weight of both arms and hands rest on the bow without paying attention to the bow hold position of the right hand. It will not matter if the fingers touch the hair from the bow. The teacher will encourage the student to let go the weight of arms, send directions to the neck to go up and forward, imagining that the shoulder girdle joints spread out and the ears are located above of the shoulders. Letting the body to react flexibly, the student will be able to sense that the body starts aligning by itself allowing the shoulder to align to the upper body. Now that both arms are hanging on the bow, the student should apply full yogic breath, focusing on exhaling and imagining the air going out through the top of the head, bottom of the pelvis and sideways through the shoulders. Also, the student has to be aware of the head, spine and pelvis as one flexible unit, and imaging during exhaling direct the shoulders away each other to align them with the upper body. The teacher might pull the student’s elbows up, so the
student will realize the state of tension or freedom of the arms and will be aware what he/she needs to let go. If there is any resistance from the arms, the teacher should suggest that the student let go the shoulders and every single joint from the upper limbs. In addition the student should body-map the joints from both upper limbs and senses the position of each part of the arms. Next, the teacher should instruct the student to move both elbows to feel the freedom of the arm and to make sure that there is not any tension while both arms are resting or sitting on the bow. If the student’s right wrist is collapsed because the student’s hand is hanging on the bow, he/she should not pay attention to it. The student will have to firmly hold the bow with the left hand and fix the bow position; also, he/she will have to sense the contact point between the index finger from the right hand and the bow. Now little by little the left hand will have to let go of the bow, while the student finds balance and equilibrium with the right elbow to keep the bow on the string and avoid collapsing both right hand and bow. It is important to keep the contact point with the right index finger, having the whole arm sitting on the bow, avoiding squeezing the bow with the right fingers and lifting the right shoulder.

When the student removes the left hand from the bow, the student should sense the weight from the right shoulder that flows through the right arm to the bow, trying to keep a well-balanced arm and hand position. The student should keep the bow on the string, allowing the weight from the whole right arm to sit on the bow. The teacher should move the student’s right elbow up and down, and the student and teacher will evaluate right away how free and flexible the shoulder girdle, arm, and bow hold are. Also, the student will be able to sense how free the wrist is and how solid the contact point between the index finger and the stick is. Likewise, the

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student might imagine that the whole right arm and elbow are floating while the bow is sustained on the string. The student should be aware that “the point of contact between the bow and the string is only an effect of a balanced arm,” and it will not happen if the right upper limb presents any tension. At first, the student might feel odd about this exercise and argue that it feels weird, or that he/she is not doing anything or that he/she does not feel any control of what he/she is doing. This new fine consciousness of gravity, weight, and kinesthetic awareness will be a strange feeling and sensation. The teacher has to encourage him/her to develop this kind of awareness as part of a good foundation of cello playing.

In the second part of the first exercise, the student will be able to find a balance point from the right arm in several parts of the bow. In addition, the student will understand that as the right hand moves away from the string, the level of the right elbow and shoulder will increase. The elbow and shoulder are at their lowest level when the bow is placed at the frog and their highest level when the bow is at the tip. The student should understand how to maintain the elbow’s and shoulder’s natural level to avoid unnecessary tension and stress. Also he/she needs to keep body mapping, sending directions, and focusing his/her breathing for the following exercise. In addition, the teacher will have to show to the student the position of the wrist, arm, forearm, and elbow for each exercise according to the bow technique that the student will learn.

The teacher should instruct the student to place the lower part of the bow on the string between the frog and the middle part of the bow. The student should repeat the first part of this exercise, placing the bow on the string in the lower part and holding it with the left hand between the middle part and the tip. Both hands will be hanging on the bow and the student will find a balance point. Then he/she will fix the right hand bow position slowly body mapping and sensing

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the joints from the right upper limb while letting go the left hand. The student will have to be aware of the contact point and free the right shoulder, wrist, and thumb. Now, the student will try to do the same exercise placing the middle part of the bow on the string and holding it with the left hand at the tip. By practicing this exercise, the student will awaken the right arm awareness balance and muscle function to keep the bow in equilibrium on the string without creating unnecessary tension.

When the student is able to place the bow on the string at the tip, he/she should body-map all the joins from the shoulder girdle and arm, consider the line of gravity and the relationship between the head, spine, and pelvis, letting the whole arm hang on the bow. The teacher will have to guide the student to avoid lifting and tensing the shoulders, wrist, and thumb, trying at the same time to have a flexible elbow and arm. When the student considers that he/she senses the weight from the shoulder girdle through the arm, to the contact point, and on the bow, the teacher might move the student’s right elbow up and down. Then he/she will be able to evaluate if the string sustains the bow, and the arm sits on the bow.

The Flexible Right Thumb

During the first part of the first exercise, while the bow is at the frog, the right thumb “keeps the stick from tipping towards the string…and regulates bow stability.”21 When the student tries the second part of the exercise, the function of the right thumb changes and it becomes a fulcrum, which is “the support about which a lever turns.”22 This support balances the weight of the bow and arm on the string. The right thumb will be a support by becoming a little

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21 Morrow, 57.

firmer, but not tense, just enough to keep the bow balanced on the string.\textsuperscript{23} When the student practices the second part of the exercise, placing the bow on the string in its different sections, the student has to be aware that the right thumb has to become firmer and more flexible as the right hand gets away from the string. For instance, when the bow is placed on the string at the tip, the leverage concept will be at its maximum and the thumb will be at its strongest state. However, this firmness and flexibility from the thumb will depend on the right alignment of the shoulder with the upper body and the free state of the right-limb joints.

\textbf{The Bow-arm in Movement and the Application of the Kinesthetic Sense}

This section will focus on the application of the kinesthetic sense and the movement of the cellist’s bow arm. The purpose of this section is not to tell what one should do when the bow is in movement. In this section the student will understand the basic sensations when the right upper limb moves the bow and what the student should sense to have smooth movements to create a good sound. Also, the student will learn and understand that looking at him/her self in the mirror, for instance, does not necessarily improve smooth, balanced movements free of tension. Tying to play a straight bow by looking at the mirror, the student will turn off the awareness of the kinesthetic sense, focusing only on what he/she sees in the mirror rather than paying attention to what he/she should sense, body-map, or feel.

To understand the natural motion of moving the bow on the string, it is important to know that a straight bow motion is a result of a right-arm curved movement. Trying to keep the bow at ninety degrees in relation with the string will happen if free joints from the upper right limb let the right arm move in a curved motion, and if the neck is free of tension allowing the

shoulders and back to lengthen and widen. The motions from the right upper limb will be smooth and easy if the student thinks about rounded motions rather than horizontal movements.²⁴

Being aware of the whole self is crucial to have a balanced body resulting in smooth movements. The teacher should instruct a beginner student the meaning of moving the bow on the string requires awareness of what the student does, knows, feels, senses, and how the upper right limb reacts. Placing the bow on the string might not be so difficult, but moving it requires a high level of body awareness. When the student moves the bow, it is necessary to be aware of the state of the neck and the right shoulder girdle joints, letting go of all the tension from them, allowing them to react organically, and allowing weight from the shoulder to flow through the arm, so it will get to the index finger, sensing the contact point with the bow.

The first part of the second exercise will show the student how it feels to release tension, and how to let the shoulder go when the right hand is sitting on the bow and in contact with the string. The teacher will have to instruct the student to place the bow on either the “g” or “d” string, depending which is more comfortable to the student. The student should send direction to the neck and shoulders, apply full yogic breath and body-map all possible joints during inhaling and exhaling. Now with the bow on the string at the frog, the student should push down the bow against the string for about five seconds. At this point the student might or might not realize that by doing this, he/she might squeeze the bow with the right-hand fingers, tensing the neck, wrist, elbow, and joints and even lifting the right shoulder. Then, he/she will have to let everything go, even the bow position, trying to keep the bow on the string. The teacher will make the student aware what it feels like when the student lets the tension go away. Depending on the level, awareness, age, etc., the student might realize right away that at releasing the tension, the

muscles and joints are freed and relaxed. If the student does not realize this, the teacher should make sure that the student practices this exercise again. After the student feels comfortable with this exercise, he/she should try it again and focus on the reaction from the neck at the time the bow is pushed against the string. If the neck gets tensed, directions should be sent to the neck before trying the exercise again and at the time the bow is pushed, he/she should imagine that the head goes forward and neck goes up. In addition the teacher might encourage the student to do the exercise again applying belly breathing and exhale while he/she pushes the bow against the string. In practicing this exercise, he/she will realize the state of muscles and joints, and the body’s reaction from bad habits. The student will be creating new mapping and planning relations about bow hold sensing weight of the arm flowing through the arm and to the bow.

In the second part of the second exercise, the teacher should ask the student to apply belly breathing, place the bow on the “g” or “d” string, and inhale. When exhaling the student will push down the bow against the string for two seconds and then let go of all tension from the right upper limb. When the student lets the tension go, he/she has to be aware of the reaction of his/her shoulder from tension to freedom. Then, the student will have to repeat the same exercise focusing on the other parts of the arm until recognizes the reaction from the right wrist and the thumb. While the student keeps working on this exercise, he/she will have to keep a good hand position on the bow. The goal of this exercise is for the student to be able to do it while keeping a good right-hand bow position and being aware of the action and reactions from the upper limb joints and muscles. Practicing this exercise, the student will be able to sit the right hand on the bow and to sense how the weight from the right upper limb flows through the arm, letting the joints from the right shoulder girdle, arm, upper-arm and hand go, so the student will not have to push down the bow against the string. The student will learn what to sense and feel, and the
whole right arm will sit on the bow, getting a good contact point with the index finger and being able to feel the string bend with the bow and index finger.

**The Application of the Kinesthetic Sense Playing Down-bow**

When one moves the bow on the string, sound is produced, and it is imperative that the student to be aware that the whole movement of the right arm is part of a system of levers. A double lever is present when the bow is played down-bow with the pronation movement and when the bow is played up-bow with the supination movement. The cellist Duo-Ling Peng writes that “the pronation action should be applied gradually, in order to counteract the lightness of the bow at the tip; similarly, on an up-bow, the supination action should be applied gradually when the bow gets closer to the frog, as the bow becomes heavier. Therefore, down-force pressure comes from the pronation action of the arm (forearm) through flexible fingers (mostly on the index finger).” However, any unnecessary tension will affect the proper function of muscles and joints, and the movements themselves. It is important to know that when one moves the bow, the movement starts from the right shoulder girdle. The joints from the latter should be free, so the student will be able to have a good contact point and sense the weight from the right arm on the bow. The right shoulder girdle will lead or initiate the movement, and the right hand and bow will follow. Saying that the right shoulder girdle will initiate or lead the movement means that the free joints from the right upper limb will allow a smooth movement, so that the use of the muscles, tendons, wrists, and fingers is in no way inhibited; if joints are restricted or locked, the whole movement will present unnecessary tensions and even pain. Therefore, one should start

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25 Krall, 31.


by freeing the joints and sensing the weight from the arm, then an actual movement might happen. For instance, when a car moves, the wheels move the car because the power comes from a stronger source, which is the engine and transmission; without them the wheels are unable to move the car. In the case of cello playing, the right shoulder girdle is the source of power to move the bow instead of the right hand or fingers.

Every teacher has his/her own way of how the bow arm should move, but that should not prevent a student from applying and awakening the kinesthetic sense in cello playing. The right shoulder girdle must be part of any bow-arm movement all the time. No matter how long or short a bow stroke is, the shoulder girdle needs to be included and free of tension. When a student plays a down-bow, the teacher has to instruct him/her to have in mind the idea that at placing the bow on the string, he/she must have all the weight from the right upper limb down on the bow to be able to engage the contact point and sense and feel the bow-hair and string bend.\textsuperscript{28} In addition, the student should sense or imagine that the neck goes up, the head goes forward, and the shoulders widen and the spine lengthens, and then the student can proceed to move the bow sideways, initiating or leading the movement with the freedom of the right shoulder girdle joints. When the student moves the bow, the student should sense and imagine that the right shoulder moves to the right and downwards. This is necessary because the farther the right hand and arm are from the string, the less natural weight from the right upper limb will be on the bow and string. The student will get a natural reaction to raise the right shoulder because the string presents certain resistance. By imagining that the right shoulder goes downwards, the student is letting it rise only as far as it needs. The right shoulder will rise anyway, but by imagining the opposite, the student will be aware how much is enough to keep the right shoulder girdle free of tension.

\textsuperscript{28} Fiser, 2.
At first, it is recommended to play a short down-bow stroke, probably from the frog to the middle lower part, and progressively increase the amount of bow use. The teacher should encourage the student to practice this exercise placing the bow on the string moving it from one section to another, such as from the frog to the lower middle part, the frog to the middle part, middle part to upper middle part, middle upper part to the tip, middle lower part to middle upper part, etc.

The following exercise will explain what one should sense playing down-bow. The teacher should instruct the student to place the bow on the string and find the balance point of the hand and the contact point as was explained in the first exercise. For instance, if the student is going to try to play a down-bow from the middle lower part to the middle upper part of the bow, he/she needs to do the first exercise to be able to apply weight on the bow, to free all joints and muscles, and to apply the breathing exercise to find a balanced position. While the student practices this exercise, he/she has to be aware of the freedom and flexibility from the right shoulder girdle and the index finger’s contact point. Also, he/she needs to be attentive that the other three fingers from the right hand follow the index finger, and the right thumb gets slowly straighten the further the right hand gets away from the string to support the weight from the arm and keep the bow in balance.\(^{29}\) In addition the student needs to remember the relationship between head, spine, and pelvis to align the head at the top of the spine. The student will have to sense the tip of his/her nose and body-map the point where the head and the spine meet. Then the student will be able to sense the current state of his/her head, and he/she will be able to align it with the spine.

When the student finds and senses the index finger contact point, he/she can play down-bow, imagining that the right shoulder girdle expands and the right arm moves downward feeling

\(^{29}\) Fiser, 2.
the weight from the right arm on the index finger. The pronation movement should happen at this
time, but the student should not aim to it. He/she should imagine doing it to make it happen
instead of doing it. In addition the student might sense that his left knee moves forward while the
student performs a down-bow as it was explained in the previous chapter. If the teacher happens
to have a student with short arms, the student may have to imagine and actually move his/her left
knee forward. When the bow gets to the middle upper part, the student will stop the bow,
keeping the bow on the string, and the right hand and arm seated on it. Then the student will hold
the bow with the left hand as he/she did in the first part of the first exercise. Keeping the bow
hand in position and feeling the contact point with the right index finger, allowing the student’s
arm to hang on the bow. Then the student should apply belly breathing, and he/she will be aware
of unnecessary tension from the right upper limb, right thumb, hand, wrist, shoulder, etc. that
occurred when he/she stopped the bow. At this point the student will have a choice of what needs
to be freer, and will have a choice to sense what it needs to be aligned.

When the student is able to play a down-bow from any section of the bow to the tip,
he/she should stop the bow at the tip and sit the right arm and hand on the bow, sensing the state
of the joints and any unnecessary tension. At this point the thumb should not be squeezing the
bow; instead it should be firm to be able to stand or support the weight from the arm and balance
the bow and arm on the string.

**The Application of the Kinesthetic Sense Playing Up-bow**

The teacher should instruct the student that playing up-bow from any specific section of
the bow to another, for instance from the tip to the middle part, the contact point stays present,
the thumb bends slowly, the supination movement happens, and the right shoulder girdle gets
back to its original position by dropping the elbow, forearm, and arm. The student should sense
the right elbow and shoulder dropping down while the right thumb gets less firm and the right index finger gets more weight from the right arm. In addition, when the student plays an up-bow, he/she might sense that the right knee moves forward to include the whole body in the up-bow motion and as a result should avoid having a static and unmoving upper body.

At first it is recommended to play short up-bows, probably from the tip to the middle upper part, and progressively to increase the amount of bow use. The teacher should encourage the student to practice placing the bow on the string, moving it from one section to another, such as from the tip to the upper middle part, then tip to middle part, middle part to lower middle part, tip to middle upper part, middle upper part to middle lower part, etc.

The following exercise shows what is needed to perform an up-bow with smooth and balanced movements. The teacher should direct the student to place the bow on the string at the middle part and hold it with the left hand to sense the contact point with the right index finger, a floating right elbow, support from the right thumb, and the weight from the right upper limb flowing through the arm. Once the student is able to keep a good bow-hand position with a balanced right arm, the teacher should encourage the student to play up-bow, for instance from the tip to the middle lower part of the bow considering that the thumb will bend a little bit while playing. Also the student should be conscious that while the right shoulder and arm move towards the body, he/she should sense and feel that the right shoulder and arm will be dropped down and pulled down from underneath. When the student stops the bow at the middle lower part of the bow, he/she must be aware that the right thumb’s function has decreased since now the right hand is closer to the string and at this point the right thumb function has switched to regulate bow stability. In the same manner, the student has to make sure the contact point is present, the state of the right shoulder girdle is passive, and the right shoulder is down. There
should be a floating sensation from the right elbow, and the locations of wrist, elbow, and arm are in accordance with the bow technique to be learned.

Finally, when the student is able to play either up- or down-bow from tip to frog or from frog to tip, the teacher should instruct the student that a straight bow is a result of awakened application of the kinesthetic sense. By sensing and feeling the curved motions from the right upper limb, the student has more possibilities to understand that a straight bow happens by applying kinesthesia. So the student should not focus on the end goal and fall into end-gaining by trying to keep the bow at a ninety-degree angle in relation with the string only by watching the bow motion on a mirror.

The application of the kinesthetic sense to the bow-arm is important to be able to perform comfortable, balanced, and smooth movements in cello playing. Being able to body-map the components of the upper limbs is essential to getting the most benefits from practicing the semi-mountain pose exercises and applying those concepts to cello playing. In addition, in awakening the kinesthetic sense, a cellist will have a clear understanding of sensing the weight of the upper limb though the arm to the bow and string, and the function and use of the right thumb that will provide a solid foundation to the right upper limb technique.
Chapter V

The Kinesthetic Sense and the Cellist’s Left-Arm

By understanding the anatomy and alignment between the upper limbs and the upper body, and applying yoga breathing and the semi-mountain pose, it is possible to awaken the kinesthetic sense to develop body awareness in the cello left arm. Efficient movement from the left upper limb and fingers depends on the freedom of the left shoulder girdle, its alignment with the upper body, and one’s capacity to sense the weight from the left limb through the arm and through specific finger. If these requirements are met, cello playing will “attain the highest possible efficiency with a minimum of movement and a minimum expenditure of energy.”¹ In this chapter I focus on developing the kinesthetic sense in the cellist’s left arm by applying the full-mountain pose, and explain in detail the importance of the sensation and use of the left arm’s weight to develop a solid left-hand technique. The discussion includes exercises for sensing the left arm’s weight, placing the left hand on the fingerboard, switching the left arm’s weight from one finger to another, and learning the left thumb’s role in low positions. Finally, this chapter focuses on the left arm’s weight in shifting position, and its function in thumb position and vibrato.

Many cellists adapt themselves to play with the tension and pain that eventually obstruct technique and musicianship development. Faulty kinesthetic awareness contributes to uncomfortable feelings, unbalanced movements, and muscular tension. Sometimes tension in the left upper limb happens because the cellist is unable to sense the state of the left shoulder, either tensed, raised, or unaligned with the upper body. Therefore, one is unable to sense the weight of the left limb, instead focusing on the outward movements of the left hand and fingers. For

¹ Joachim Stutschewsky, The Art of Playing the Violoncello: A System of Study from the Very Beginning to a Stage of Perfection, 6 vols. (Mainz: B. Schott’s Sohne, 1932), 1: 29.
instance, when the cellist squeezes the neck of the cello with the left thumb and presses a string with the other four fingers too much, he/she might not be able to perform a left-hand shift smoothly and correctly. The cellist might feel that more practice is the solution without realizing that the left shoulder is not free of tension and that the weight of the left upper limb does not flow through the arm. The tension in the left shoulder affects the whole movement from the arm, fingers, the shift itself, and intonation.

**Kinesthesia, the Left Arm, and the Full-mountain Pose**

The ability to sense the weight of the left upper limb concentrated in a finger and being able to find a balanced left arm are two of the most important foundations for developing a good left arm technique. Not being aware and being unable to sense where the weight of the left limb is located, will lock joints and create muscular tension in the whole arm, bad habits, and pain.

To sense the weight of the whole arm, the student needs to start developing awareness of the left limb and sensing the state of the whole left arm by applying full yogic breath in semi- and full-mountain poses to align the left arm with the upper body. For practical purposes, it is best to practice the following exercise with both upper limbs because it will awaken the kinesthetic sense on both arms, align them with the upper body, and make one aware of their weight location. To sense the weight of both arms, it is necessary to have a good sitting position with a strong and supported base that will allow the spine to have its natural shaped curves, allowing the head to be at the top of the spine. As was explained in chapter III, the application of yoga breathing and the semi-mountain pose will allow both upper limbs to be aligned with the upper body. The teacher should instruct the student to sit on a chair, body-map the shoulder girdles, arms, neck, and spine; and apply the full-mountain pose, in which the student should have both arms at the sides with the palms facing forward and “draw the shoulders back and
down so the chest will lift slightly.\textsuperscript{2} The student might feel tension in the upper back and shoulders, and to release it, he/she should apply full yogic breath, and imagine that all the joints and discs from the spine, shoulder girdle, and neck get full of air during inhalation, and that the air comes from them at exhalation. Also at exhalation, the student should allow the head to react and allow it to be aligned at the top of spine while both shoulder girdles react as well. Tension in the shoulders and upper back will diminish until the student feels that the shoulders are in their lowest position or has the sensation that they are hanging from the upper body.

Now that the student will be able to let the shoulders hang from the upper body and keep a smooth full-mountain pose without drawing the shoulders back and down, and with the upper body free of tension, the student should bend both elbows, bringing the hands upward without changing the position of the upper arms, and move the hands in a supine motion so that the palms face downward. By changing the position of the lower arms and hands and continuing to apply full yogic breath, the student will be aware that the shoulders might go downward more. The upper body will get a balanced pose with the head at the top of the spine.

\textbf{Sensing the Weight of the Left Arm}

After the student is able to sense a balanced state of the upper limbs, he/she is ready to sense how the shoulders are able to carry both arms. The following exercise will awaken the kinesthetic sense in the upper limbs, helping the student to sense the weight of the arms at the shoulders. The teacher should instuct the student that after applying the full-mountain pose, the arms bent at the elbow, the palms face downward, and the shoulders at their lowest level, he/she should body-map both shoulder girdle joints and imagine how all those joints move freely while both elbows are raised, keeping the shoulders at the same level and getting the arms and hands

\textsuperscript{2} Mia Olso and Jonathan Feist, \textit{Musician’s Yoga: A Guide to Practice, Performance, and Inspiration} (Boston: Berklee Press, 2009), 45.
parallel to the floor. The student should apply full yogic breath and be aware that any tension from both shoulder girdles should be released during exhalation, letting the hands hang at the wrists. The student should be aware that the hands and lower and upper arms are suspended or floating in the air, while all the weight from the arms is concentrated in the shoulders.

The following section is intended only for the left arm. The student should learn how to transmit the weight of the left arm flowing through the arm and through the fingers, keeping the left shoulder girdle, elbow, wrist, and hand joints free of tension. A chair will be needed and located by the student’s left side. Having the left elbow bent, arm and hand suspended and parallel to the floor, the student will have to stretch the elbow and place the “finger tips on the back rim of a chair.” The student might let the wrist collapse while the fingers hold strong enough to avoid the arm falling from the back rim of the chair. The teacher might lift the student’s “wrist to construct a gently bridge-like arch, creating the leverage necessary for the most efficient transmission of energy.” The student will be aware that by letting the shoulder be free, he/she is able to transfer the weight of the arm to the fingers leaving the left arm and hand joints free of tension. The student should try to leave only the index or first finger on the back rim of the chair, with the rest of the fingers barely touching the chair. The student should be aware that this might create tension in the left arm joints and even in the neck, so he/she should body-map the spine, neck, and shoulder girdle, and apply full yogic breath to release their tensed state. The student will be easily able to release tension and have the first finger able to support the left arm’s weight. Once the student is comfortable using only the index finger, he/she should

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5 Ibid.
try this exercise with the middle or third finger. The student will find that by switching fingers, he/she is switching the weight of the left arm from one finger to another, a fundamental concept in the left-arm technique. The student should notice that at first there is going to be a tendency for the upper arm to tense, so every time he/she switches the arm’s weight from one finger to other, he/she should let go any tension by being aware of it, body mapping, and breathing. After the student feels comfortable switching weight from index or first finger to middle or third finger and vice versa, he/she can practice this exercise with all possible combinations starting with 1<sup>st</sup>-2<sup>nd</sup>-1<sup>st</sup>, 1<sup>st</sup>-3<sup>rd</sup>-1<sup>st</sup>, 1<sup>st</sup>-4<sup>th</sup>-1<sup>st</sup>, 2<sup>nd</sup>-3<sup>rd</sup>-2<sup>nd</sup>, 2<sup>nd</sup>-4<sup>th</sup>-2<sup>nd</sup>, 3<sup>rd</sup>-4<sup>th</sup>-3<sup>rd</sup>, etc.

**Placing the Left Hand on the Fingerboard**

Based on the previous exercises and having the cello in place, there are two ways to get the left hand on the cello fingerboard. First, Elizabeth Morrow, cello teacher, suggests that the back rim of a chair where the student has placed the fingers of his/her left hand, can be gradually rotated “nearer to the fingerboard, [and] the hand can gradually be re-oriented to the fingerboard.”<sup>6</sup> The second way is by returning to the previous exercise after practicing the full-mountain pose, bending the elbows with the palms facing downward, and lifting the elbows parallel to the floor, thus orienting the left hand towards the fingerboard. In either way the student should initiate the movement from the left shoulder girdle, sensing and imaging the left shoulder blade moving around and forward while the left hand and arm react to the shoulder movement.

In the following exercise, the teacher will instruct the student to place the index or first finger on the “d” string, for instance, and sense that the finger sits on the string, by transmitting the weight from the shoulder to flow through the arm and through the index finger’s

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<sup>6</sup> Morrow, 58.
last phalange, which has to be stronger or firmer but tensed. The student will realize that the string will be pushed downward against the fingerboard without any effort because the weight of the arm pushes the string down. For now the cellist should not pay attention as to where to place the left thumb as long as it is free of tension.

Once the student is able to sense the weight of the left arm at the tip of the index finger, and in contact with the string and fingerboard, he/she will sense the necessity to find a balance place for the left elbow to get the most comfortable position for the whole arm. The teacher should make sure that the left arm is suspended and balanced while weight of the left upper limb flows through the arm and through a finger, which rests on the string/fingerboard. The student needs to be aware that the “wrist as well as the elbow must be supple—not taut—a matter than can be checked by the teacher raising and lowering the pupil’s wrist, or elbow,” which should not show any sign of resistance.

In addition, the teacher should instruct the student to be aware of what happens when no fingers are pressing the string down. The arm’s weight has to be concentrated on the shoulder, leaving all the joints from the hand, wrist, elbow, and shoulder free of tension. So, when a finger presses a string down, unconsciously the planning relationships stored in the brain will send an impulse through the nerve/muscular system, and the student will be able to transfer the weight from the shoulder to the desired finger in no time. When no finger is pressing the string down, the student should not maintain or keep tension in the left arm, hand, or fingers because that will reduce the hand’s freedom and the accurate use of the fingers. For instance, if the student has to play in first position a “c” with the fourth finger on the “g” string, open “d” string and “e” with

7 Young, 56.
8 Stutschewsky, 2: 66.
9 Ibid., 1: 21.
first finger on the “d” string, he/she will press the string with the fourth finger, letting the weight of the left arm flow through the arm to the fourth finger and finding the elbow’s place in relation to that specific finger to balance the whole arm. When the “d” open string is played, the fourth finger is lifted from the “g” string, and the student should let the weight of the arm be concentrated at the shoulder, getting a balance point for the elbow. The movement from the fourth finger will generate a nervous and muscular impulse to lift the fourth finger up and transfer the weight concentrated in the fourth finger to the shoulder, preparing the hand in a free state to play the next note. When the student plays “e” with the first finger on the “d” string, he/she should sense how the weight of the arm at the shoulder is transferred from the shoulder and concentrated in the first finger, allowing the finger to press the string down. This movement will enable the student to find an equilibrium point for the elbow where all the joints are free from the left upper limb to maintain the arm in balance.

One Finger at a Time: Shifting Weight from One Finger to Another

If the student is aware of the state of the neck, shoulders, and back, then he/she will be able to notice the state of the whole left arm and sense where the weight of the arm is concentrated. The kinesthetic sense will be awakened, and the student will have the choice to perform either smooth and balanced movements or unbalanced and tensed movements. The following exercise will help the student understand the importance of being able to switch the arm’s weight from one finger to another, engaging one finger at a time. After the student finds the elbow’s balance point for the index or first finger, for instance, to balance the whole arm, he/she can switch the arm’s weight and press the string down with the second finger. When the student switches the weight of the arm from the first to the second finger, the latter will press down the string, and the first finger will be released from pressing the string down because there
is no weight on it to keep it pressing the string down. In a conscious manner, the student should notice that the left elbow’s balance point will have to be adjusted to find a balance while the weight of the arm is concentrated on the second finger. However, the student must be aware that retaining weight in the first finger while the second finger is called on to serve might cause harm or pain eventually because the student does not allow the elbow to get its balance point for each finger. Claude Kenneson makes it clear that “pressing a musically inactive finger into the fingerboard in order to hold a synthetic hand position intact defeats the ability to create a changing balance between various fingers. When the note is finished, the release of the finger must be related to the finger that is carrying out the next action.”

Finally, the student will notice that there is going to be a slight rotational movement in the left hand when the weight of the arm is switched from one finger to the other. This rotational movement is a reflex or reaction of switching weight from finger to finger. Applying weight to a specific finger means that the active finger is engaged but that it and all the fingers are free of tension. Allowing the left arm’s weight to be transmitted through the arm to a specific finger allows the student to balance the arm with the most comfortable elbow position. The shoulder girdle, elbow, hand, and fingers joints are free and ready to move, and when the student presses the string, with first one finger then another, he/she is switching weight from the previous finger to the next finger and keeping all joints free.

The elbow balance point will have to be adjusted for each finger because each finger has a different size. As a result, when the fingers are placed on the fingerboard, they present different angle relationships to the fingerboard. As each finger is placed on the fingerboard, it presents a

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specific elbow point to balance the whole arm. If another finger presses the string down, the elbow’s angle and balance point will change to keep the whole arm in balance.

**The Left Thumb in Lower Positions**

In the lower positions, the left thumb is placed under the neck of the cello, close by, or under the second finger for balance purposes, and it should not press the cello neck at any time. Sensing the weight of the left arm concentrated in the active finger will make the left thumb flexible, so its position will depend on what finger is used and the position of a balanced arm. However, when the student stops sensing the weight of the arm in a specific finger, as a reflex, he/she unconsciously compensates this lack of awareness by squeezing the cello neck with the left thumb, making it inflexible with a fixed and tensed position. The left hand, elbow and shoulder will have their own position for each finger, and they can affect the thumb’s flexibility if the elbow is unable to get to its balanced point. If the shoulder girdle is tensed and the weight is not concentrated in a specific finger, the whole arm will be unbalanced. Also, crossing the left hand from one string to another involves the hand’s sideways motion, which should start with the freedom of the left shoulder girdle followed by the movement of the left shoulder, arm, and hand, which refines the movement through the fingers. If the left thumb squeezes the cello neck, the sideways motion of the left hand will not happen smoothly, tensing the whole arm, shoulder, back, and neck.

Transferring the weight of the left arm from the shoulder through the arm and through a specific finger will allow the student to locate the most comfortable position for the elbow, letting the left thumb be free of tension without the necessity to press the neck of the cello. Switching the weight of the arm from one finger to another will relocate the elbow making the left upper limb, including the shoulder, arm, elbow, hand, and its five fingers, moveable and
balanced all the time. On the contrary, when a student turns off awareness from the left upper limb, the hand keeps working, but the small adjustments that he/she has to do to keep the left hand working smoothly are not present, making the student perform in an automatic mode without awareness. The application of the kinesthetic sense in cello playing is a personal choice; being aware of how one uses the whole body, including the upper limbs, will be reflected in both technique and musical interpretation.

**Sensing the Left Arm’s Weight in Shifting Positions**

Finding information about left-hand shifting technique in cello playing, one can locate either specific information about how the left upper limb should move or cello exercises to learn how to perform all kind of shifts, but without considering a kinesthetic state of the left arm, such as the use of arm’s weight and shifting weight from one finger to another. The following examples are several cello teachers explaining the left-arm performance during shifting. Gerard Mantel gives detailed information for an ascending shift:

> In its initial phase the movement of the elbow serves to lengthen the time devoted to the shift and thereby provides better control of the total movement. In its second phase the elbow movement runs perpendicular to the fingerboard and thus determines the goal; the hand and finger are pulled after it and pressed to the fingerboard in the third phase by a slight lifting of the elbow. The sliding movement of the finger starts shortly before the elbow has reached its lowest point.  

On the other hand Louis Potter gives a clear explanation of how shifting should be done, explaining and illustrating how fingers are replaced during a shift and the distinction between articulated and smooth shifts.  


for a clean, tension-free shifting. When shifting upward, it is helpful to use small up and down movements…of the wrist before the shift.”¹⁴ Last, Janos Starker suggests that one should

connect positions instead of fingers or notes…preserve the always of the angle of the hand and fingers to the string…rotate the forearm outward or inward according to the direction and according to the basic approach in finger contact…prepare the next position of the arm.¹⁵

All these suggestions are valuable from the outward cello playing point of view, but they do not explain what one should sense to make a shift happen naturally with the least expenditure of energy. They suggest an end by preparing, moving a specific part of the arm, and/or replacing a finger at specific time. Performing a shift by making movements happen without considering and sensing the state of the left upper limbs and arm’s weight could make a cellist get a faulty kinesthetic sense input.

Before performing a shift, the teacher should instruct the student that he/she has to sense the arm’s weight on the active finger and free all joints from the left upper limb. Shifting should follow a certain “sequence of body movement, it always…starts from the heavier to the lighter part of body,” the shoulder girdle, the upper arm, the forearm, and the hand, and the specific finger.¹⁶ A free shoulder girdle will let the arm and hand unit move freely because this “mobility is characterized by a free-moving upper arm, a flexible elbow, a pliant wrist, and a left hand that is responsive to the total cooperation of the limbs.”¹⁷ For instance, playing a “b” on the “a” string in first position with the first finger and shifting to an octave higher with the third finger on the “a” string as well, the student should body-map the left shoulder girdle and sense the weight in


¹⁵ Starker, 149.


¹⁷ Kenneson, 77.
the first finger, allowing the whole arm to be in a balanced and flexible pose. Also, the student should be aware of the state of the neck and shoulders by imagining the space between ears and shoulders, and sensing the ears are above of the shoulders allowing shoulders, neck and back to react organically. Considering that once the student senses the weight of the left arm in the first finger, he/she can imagine and sense that the left shoulder blade pushes forward the shoulder. This will make the student conscious of including the shoulder girdle in the shifting movement. The free shoulder girdle will allow the whole arm to move smoothly while the hand and finger will be in charge of refining the movement. The movement of the whole arm from the free shoulder will make the weight of the arm switch to the third finger, direct the whole arm, and stop the finger-hand on the desired pitch. In addition, the movement of the torso and pelvis during the shift cannot be overemphasized. As was explained in chapter III, the student could sense the left knee moving forward, a movement that should start from the pelvis. Without power from the whole left arm and the freedom from the left shoulder girdle, the active finger itself would be unable to move the whole arm smoothly, and have a successful movement and good intonation.

Performing a descending shift on the “a” string from a “b” in thumb position, with the third finger shifting to an octave lower in first position with the first finger, the student has to consciously start the movement by letting the shoulder girdle be free, sensing the weight of the arm on the third finger, and sliding the third finger to the lower “b” in first position, initiating the slide from the upper arm. The shifting movement should start from “the heavier to the lighter part” of the

\[\text{\textsuperscript{18} Mantel, 54.}\]
left upper limb.\textsuperscript{19} As a reflex, the student will notice that the upper arm and elbow move “first towards the body and then pull the hand and fingers after it.”\textsuperscript{20} The movement from the elbow, hand, and fingers is just a reaction to the movement initiated at the left shoulder and upper arm. Also, the student should sense that the shoulder blade moves towards the spine and that the pelvis moves the right knee forward to return the torso and pelvis to their initial position. The shift will be completed once the first finger gets to the lower “b” in first position, the student concentrates the arm’s weight in the first finger, and the arm and elbow get the proper balance point for that finger.

**Thumb Position**

In thumb position, the left-thumb can be considered as a pivot that “is set edgewise on two strings at a right angle,” supporting and following all the actions of the hand.\textsuperscript{21} Usually, learning thumb position is a painful experience because the left thumb does not have enough muscle where it has contact with the strings, and pressing the “a” and “d” strings, for instance, against the fingerboard with the thumb without applying the arm’s weight can be a painful, tense, and stressful experience. Without applying the weight of the left arm in thumb position, the student will have a strong tendency to create a faulty kinesthetic awareness. More specifically, there will be a tendency to press the strings with the thumb, creating tension in the wrist, shoulder, neck, and back, affecting the upper body alignment as well.

The teacher has to instruct the student that in thumb position all the fingers from the left hand have their own point of balance with the elbow. To learn thumb position, the student has to place the thumb on the “a” and “d” strings and transfer the weight of the left upper arm to flow

\textsuperscript{19} Sazer, 152.

\textsuperscript{20} Mantel, 57.

\textsuperscript{21} Stutschewsky, 5: 30.
through the left arm and through the left thumb and remembering to be aware of the state of the neck, shoulders, and back. The student might not be able to press the strings all the way down, but he/she will be able to sense the weight concentrated on the left thumb to press both strings down. By having a left thumb free of tension, “the arm, forearm, and hand are also free and able to achieve a better balance and reduce tension.”

Now the student has to find the most comfortable balance point for the elbow while using the thumb and keeping the weight of the arm concentrated in the thumb. Later, with practice, the student will be able to concentrate, sense more weight on the thumb and be able to push the strings all the way down with almost no effort.

Once the student feels comfortable sensing the weight of the left arm in the thumb, he/she can place the first finger on the “d” string by switching the weight from the thumb to the first finger. It is important to notice that for each finger, the hand, wrist, elbow, and arm have a specific balance location. The student will notice that the more fingers are added the more the hand and arm will move in the direction of the cello bridge. Conversely, as the fingers are removed from the string, the hand and arm will move towards the cello scroll. This movement from the hand is a reflex from the whole arm movement since every time a finger is activated or engaged the shoulder girdle will let the arm, elbow, and hand get a specific balance point for that finger. The hand will adjust every time a finger is added or removed, finding the best elbow’s balance point. In addition, the student should have in mind that “each finger has to be considered separately in its relationship to the thumb...because each finger requires its own liberty to strike or be placed at the proper angle.”

So, the position and alignment of the “thumb

\[22\] Sazer, 120.

\[23\] Marcus Adeney, *Tomorrow’s Cellist: Exploring the Basis of Artistry* (Oakville, ON: The Frederick Harris Music Co., 1984), 78.
may vary depending on the configuration of the notes and fingers used during playing.”

When the student senses and feels the arm’s weight in a specific finger, the teacher should move student’s elbow up and down slightly to verify that the whole left upper limb does not present any resistance or tension in its joints. Once the student is able to sense or concentrate the weight of the arm in each finger, he/she can practice all kinds of combinations switching the arm’s weigh from one finger to another, for instance T-1-2-3-4, 4-3-2-1-T, T-1-T, T-2-T, T-3-T, T-4-T, 1-3-1, 1-4-1, T-2-4-2-T, 1-3-T-2-4-3-T, etc.

Since the arm’s weight makes the fingers press the string down, the finger that is not engaged or active should remain passive, lifted or on the string but taking action since the engaged or activated finger is the only one with weight to press the string down. In the same manner, while playing in thumb position, the thumb can remain passively on the string when it is not engaged. If the third finger is active or engaged, the thumb, first, and second fingers will remain on the string but hardly touching it, since all the weight is concentrated on the third finger. Therefore the location of the shoulder, arm, and elbow’s balance point depend on the finger, the string, the register used, and how fast the fingers move.

**Vibrato**

Once a student knows how to transfer weight from the left shoulder to a finger and switch weight from one finger to another, learning vibrato should not be a problem since it is a combination of concentrating the arm’s weight to a specific finger and making the movement from the whole arm. Unfortunately, when a student wants to learn vibrato and he/she does not have any conscious idea about sensing weight from the left upper limb, learning it can be a big challenge.

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24 Sazer, 168.

25 T = Left thumb.
Mantel mentions that there are four types of vibrato in string playing: use of a finger to initiate vibrato, use of wrist motion, use of forearm rotation only, and use of the arm in a pendulum movement, creating a double leverage of the bent arm. He proposes that the most useful vibrato in cello playing is the last one because “with the big upper arm vibrato there is not active movement in the fingers, the wrist, the forearm, or the elbow joint,” and “the farther away from the finger the motor of the movement is, the easier it becomes to separate the finger movement from it.”

In addition Joachim Stutschewsky suggests that “vibrato is most useful if initiated at the shoulder and passed on by the upper arm without any rolling action of the forearm. Thus the arm, hand, and fingers will form a swinging unit. This way of performance secures regular movements and can equally be applied to all parts of the fingerboard.”

The following exercise will show the student how to awaken the kinesthetic sense during vibrato and to make use of the whole left arm. The teacher should instruct him/her that this part of the exercise should be done without a cello. The student should have a balanced sitting position with the head aligned at the top of the spine, and apply full yogic breath. He/she should apply the full-mountain pose to align both upper limbs with the upper body. Once the shoulders are at their lowest level, the student can bend the elbows forward and turn the wrists inward so that the palms face the floor. Then the student can drop the right arm and focus on the left one. The student has to raise the left elbow without raising the shoulder and start slowly moving the whole left arm up and down, starting the movement from the left shoulder to the point that the hand goes upward while the elbow goes downward, and vice versa. The student should remember to keep a balanced upper body while speeding up the movement, letting the wrist,

26 Mantel, 103–4.
27 Ibid., 104–5.
28 Stutschewsky, 5: 3.
hand, fingers, and shoulder move freely as a reaction of the whole movement from the arm. The student might place his/her right hand on the left collarbone-sternum joint to feel how that joint is involved in the movement. Having the right palm on the left collarbone-sternum joint, “the right forearm, held upright in front of the chest,” will substitute for the neck of the cello.\(^{29}\) Then the student should orient the left hand gradually and place the left first finger on the right forearm pretending that it is the cello’s fingerboard and concentrate the weight from the left arm in the first finger. The student might sense and feel that since there is no string to press down, it will be easier to keep wiggling the left arm while the weight is focused on that finger.

The teacher should now ask the student to get his/her cello and try the same exercise, and this time place the first finger on the finger board, pressing down the string, and trying to keep vibrating while shifting weight from one finger to another. Also, the student should remember that only the engaged or active finger has to remain on the string, allowing the whole arm to move in a balanced motion. The student might realize that there is a difference between finding the right elbow’s balance point with vibrato and doing it without vibrato. For instance, while vibrating, the elbow’s point of balance in first position for the first finger will be way back towards the scroll. However, for the fourth finger, the elbow’s point of balance will probably be towards the bridge, depending on the length of the student’s finger and arm. In addition, Maurice Eisenberg suggests that the left thumb should not press against the neck of the cello, but remain loose; also the left thumb should not hang away of the neck of the cello because that “could disturb the hand placing and lead to insecurity of intonation.”\(^{30}\)

In thumb position the teacher should show the student that the elbow’s balance point for the first finger will be farther from the bridge and closer to the cello scroll, and when the fourth

\(^{29}\) Porter, 109.

\(^{30}\) Maurice Eisenberg, *Cello Method of Today*, 5th ed. (Borough Green, UK: Novello, 1983), 110.
or third finger is vibrating the elbow’s balance point will closer to the bridge and farther from the cello scroll. In addition, the student should be aware that no matter in what position he/she plays, either in the lower or in the thumb position, the amplitude of the vibrato will depend on the length of the string, so “the shorter the string the narrower the amplitude of the vibrato must be in order to maintain the same range of pitch.”  

Aligning the left upper limb, applying full yogic breath, engaging in the full-mountain pose, and sensing the left arm’s state and the location of its weight are fundamental concepts in developing a good left-hand technique. The important issues here are the awareness of sensing the weight of the left arm in low and thumb positions, and switching weight from one finger to another both in shifting positions and when using vibrato. When the tension has been released from the shoulder girdle, neck, and back, the weight from the left arm will be able to flow freely through the arm and through a finger, allowing the student to perform smooth and balanced movements using the least amount of energy during performance.

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31 Mantel, 112.
Chapter VI

The Kinesthetic Sense Applied in Both Upper Limbs in Advanced Cello

Literature

In the previous chapters, I focused on the basics of cello technique, applying concepts of the Alexander Technique, Feldenkrais Method, and Yoga as important tools to awaken the kinesthetic sense. This chapter will explain how the upper limbs are kinesthetically different from each other in cello playing, including a discussion about bilateral and quadrilateral transfer. Employing excerpts from the advanced cello literature, I will discuss the application of the kinesthetic sense to several situations in cello playing, including slow bow and vibrato, loud dynamics and vibrato, and different bow articulations, such as *staccato* stroke and controlled *ricochet*, double stops, and voicing double stops.

**Kinesthesia and the Upper Limbs in Cello Playing**

Both the player’s upper limbs depend on a balanced sitting position and a relationship between the head, neck, and back while the spine is enlarged from the top of the neck to the pelvis. Both upper limbs move starting at the shoulder girdle, and any sign of tension in the neck, shoulders, or back will immediately affect the shoulder girdle’s mobility and the upper limbs.

In cello playing the hands should be active and passive, sensing and reacting to what it is needed to play the musical content of any melody, phrase, piece etc. It is imperative that one is aware of what one senses and feels during a movement or action. Sometimes a motion or movement might look well, but what is more important is how one perceives any movement and the state of the body after that movement or action.

When both hands and upper limbs work together to make music, rarely do they move, sense, or feel in the same way, because their kinesthesia differs from each other. Kinesthetically,
their fundamentals are the same, but when they are used to play cello their state, movement, and relation to each other, as well as the muscular effort, weight application, and distribution, are different.

William Pleeth, cellist and cello teacher, mentions that the hands “understand one another, they relate to each other, and…at the same time they are independent of one another.” Each hand does “different jobs that imply an imbalance…and trying to use them with equal tension…will prevent…from discovering what has to be done in order that each hand may have the right amount of tension within the framework of its function.”

The left hand is in charge of playing the desired pitches in tune, moving all over the fingerboard, and applying different kinds of vibrato, while all its joints are movable all the time allowing the elbow to find its balanced position and the fingers to receive the weight of the shoulder through the arm. At the same time, the right hand is in charge of moving the bow, allowing the weight of the arm to engage the index finger contact point of the bow, and allowing adjustment of the amount of weight and bow speed, which are needed to perform all kind of sound colors, articulations, and dynamics within a musical context. When one is aware of both hands individually performing music, solid and strong planning and mapping relationships can be created in the brain creating balanced movement patterns and coordinated movements between the upper limbs. This individuality is necessary to produce a dialogue between both hands as they each perform their own role to create music. This is what Pedro de Alcantara calls bilateral transfer, which is “the unceasing dialogue between the two sides of the body on matters of position, movement, tension, and relaxation. Bilateral transfer can be either a collaboration or a fight.”

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tries to create a balance of effort between both upper limbs, having as a result unbalanced movements and uncomfortable sensations affecting skills, cello technique, and performance. The former happens when one does not focus “on the limb or limbs that are moving at a particular time but on the limb or limbs that contribute the most to [the] body’s stability.”\(^3\) For instance, in a passage where fast sixteenth notes are played in *fortissimo* dynamic, the right arm will have to concentrate its weight on the bow using whole arm motion with small amount of bow. At the same time, the left hand will have to move fast and light with not much weight on each finger, just enough to allow the fingers to press the string fast enough while the left elbow finds its balanced position for that specific measure, phrase, or passage. Alcantara points out that an “average cellist focuses on the busy left hand and charges it with eagerness and worry. Frequently, the cellist will neglect the right hand, assuming its role is minor and its gesture trouble-free.”\(^4\) So he/she will not be able to play the passage correctly. “But if the cellist decides to make the bow arm be the primary concern and the left arm be the secondary concern, the bowing arm leads….The left hand will receive the message and absorbs the right hand’s strength, even though their technical tasks are so different.”\(^5\) The ability to sense and include movements from the lower limbs along with the upper limbs is called quadrilateral transfer, which is “the interplay of energies among all limbs.”\(^6\) This happens when one senses and allows either the left or right knee to move in accordance with the upper limbs’ movement, allowing in one dialogue the flexibility and freedom of the lower and upper limbs. This flexibility will allow both hands to

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\(^4\) Ibid.

\(^5\) Ibid.

\(^6\) Ibid., 188.
perform their job, focusing on the upper limb that executes the less complicated task and storing in the brain solid movement patterns to develop a strong cello technique.

**The Kinesthetic Sense Applied in Cello Literature**

The following excerpts from literature will illustrate how both hands work kinesthetically in cello playing. The student should be aware of each hand, paying attention to what needs to be adjusted, let go, and sensed during playing. The following exercises, bowings, fingerings, and phrasing exemplify one of many ways how the upper limbs can work together and how they can have their own balanced way to perform in relation to what they do and their alignment with the upper body, instead of finding a relationship between each other. They work independently of each other doing different tasks because their physical movements are disconnected, and in most of the cases the upper limbs need to be either independent from each other’s movements since they perform different jobs.

**Slow Bow Motion and Vibrato**

In the following two excerpts from Serge Rachmaninoff’s (1873–1943) Sonata for Piano and Cello, Op. 19, third movement, I will focus on the application of the kinesthetic sense in vibrato in the low and middle register, loud and soft dynamics with slow bow motion, and breathing suggestions. In the first excerpt, mm. 9–17, a slow melody in *forte* dynamic, the right hand will sustain the sound with the bow, and the left hand will be able to move and vibrate with different intensities as necessary (see Figure 1.1).\(^7\)

First, the student needs to get a balanced sitting position, awaken the kinesthetic sense, and apply any somatic study’s tool, so he/she will be able to sense the state of the body and decide what it needs to be aligned or adjusted. Also, the student needs to be aware that in order to obtain a loud and intense dynamic, it is necessary to use the whole bow and a wide and fast vibrato. Once the left shoulder is aligned to the upper body, the student will be able to find the arm and elbow balance point. That will allow him/her to apply vibrato, which involves movement from the whole left arm including the left shoulder girdle. At m. 9, the intensity and length of the vibrato should increase on each note. Playing the first note, “b flat” with the second finger on the second string at m. 9, the student has to find the elbow’s balanced position for this kind of vibrato and for this finger. When the second finger shifts to the first finger, moving from “b flat” to “e flat,” the whole body has to be included, transferring the weight of the left arm from the second to the first finger and letting the first finger find the right angle and the elbow’s point of balance. In addition, the angle of the left arm for the first finger “e flat” is recommended be forty-five degrees in relation to the cello neck to continue with the same intensity of the vibrato.  

In order to keep the whole upper body in balance, maintain the intensity of the vibrato and connect both notes musically, the student might give directions to the neck, head, and back.

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before shifting from the “b flat” to the “e flat.” Also before the shift, the student can sense the state of the pelvis, and at the time of the shift he/she might sense the right knee moving forward to include the whole upper body from the top of the head to the base of the pelvis.

At the same time, when the student places the bow on the “d” string, he/she needs to find the elbow balance point and engage the right first finger contact point. In general, the student needs to sense that the bow arm pulls during down-bow motion and pushes in up-bow motion adjusting the weight and speed of the bow. These adjustments will be determined by the student’s conception of sound and timbre that he/she desires. The student will judge the best place to place the bow between the bridge and the fingerboard, considering that “the proximity to the bridge is for slow bows, forte dynamics, and high registries/positions; proximity to the fingerboard is for fast moving bow, piano dynamics, and lower registries/positions.” It is advisable to play the first three notes with a crescendo on each note using more bow on each note, playing the third note the longest, and at the time the third beat is played, “b flat”, the whole arm should keep its movement, engaging the shoulder girdle, and sensing the left knee moving forward to include the pelvis with the bow motion. At the time the “e flat” quarter note is played, the student has to imagine that the shoulder girdle keeps stretching to the right to be able to sustain the sound and continue transmitting weight to the bow.

The second excerpt from this movement, mm. 41–48, illustrates the application of the kinesthetic sense of both arms for a soft dynamic in the upper middle register (see Figure 1.2).

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10 Rachmaninoff, 9.
Fig. 1.2 S. Rachmaninoff, Sonata for Piano and Cello, Op. 19, third movement, mm. 41–48.

On m. 41 the note “e flat” in the first beat is played down-bow, and the student should finish playing it in the lower part of the bow. When the bow switches to the “a” string a whole arm motion will be needed, and that movement must be initiated from the shoulder girdle instead of from the hand. The student should include movement from the pelvis to keep the contact point between the bow and the string, and to keep the right elbow balance point engaged as well when the bow switches from the “c” to the “a” string. Once the bow is on the “a” string, the right hand index finger contact point should stay active even though the dynamic is pianissimo and the whole arm keeps moving using a small amount of bow, with a little more use of bow for the notes where the tenuto marking is placed. The student will not use a lot of bow, but the whole arm will be involved all the time. The student has the choice to phrase the next eight measures, from mm. 41–48, either with vibrato or with the bow. If it is done with the bow the weight and speed of the bow will be used to emphasize the notes with tenuto marking, and the vibrato will remain mostly calm or passive. If the vibrato is used for musical expression, it will emphasize the tenuto notes, and the bow will be in charge of the dynamic level only. In any case, if
continuous vibrato is wanted the student will shift weight from finger to finger all the time, avoiding any tension in the left arm.

In the third beat of m. 45 the note “g” can be played with either the second or fourth finger followed by a shift to the note “e flat” with the third finger. The right upper arm has to adjust its weight to the bow and adjust its speed to keep the desired dynamic level, intensity of vibrato, and bow contact with the string. The left upper limb might include pelvis and shoulder girdle movements, and weight shifting from the second to the third finger to be able to keep vibrating the high “e flat.”

Last, being aware of breathing in these two excerpts is important because it will help keep a continuous pulse. Belly breathing is recommended, and deciding where to inhale and exhale is a personal choice because the capacity of the lungs varies in each person. Exhaling is recommended before playing a loud dynamic, a shift, a pause, or a moving line, and inhaling should be done according to musical context. Before playing mm. 9–17, the student should apply either belly or rib cage breathing and exhale starting at m. 9. Then he/she can inhale at the second beat of m. 10 and exhale at the downbeat of m. 11. The next exhalation is recommended at the fourth beat of mm. 13, 14, and so on. For the second excerpt, exhalation is suggested in the downbeat of m. 41 and inhaling at the second beat; then the student might exhale on the second beat of m. 43, the third beat of m. 45 and the second beat of m. 48.

**Loud Dynamic and Vibrato**

The following excerpt comes from Dmitri Shostakovich’s (1906–1975) Concerto No. 1 for Violoncello and Orchestra, Op. 107; the first movement will show the application of the
kinesthetic sense on intensive vibrato and full dynamic. The following discussion is based on mm. 86–108 (see Figure 2).\footnote{Dmitri Shostakovich, \textit{Concerto No. 1 for Violoncello and Orchestra Op. 107}, ed. Mstislav Rostropovich (Hamburg: Musikverlag Hans Sikorski, 1960), 3.}

Fig. 2 D. Shostakovich, Concerto No. 1 for Violoncello, Op. 107, first movement, mm. 86–108.

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CELLO CONCERTO No. 1 IN E FLAT, OP. 107
By Dmitri Shostakovich
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- Measure: first movement 86–108 of cello solo part

The following body awareness suggestion is my personal interpretation that can be applied to other excerpts with a similar musical context. It is important to apply the full yogic breath before playing this passage because when inhaling the student will be aware of the state of the neck, back, and head, and when exhaling he/she should let them react accordingly to realign the upper body, allowing the head to be at the top of the spine, the neck to go up and forward, the
spine to enlarge, and the shoulders to spread. After the student applies a full yogic breath several times, letting the body react organically, it is recommended to exhale at the beginning of a phrase or where shifts happen, for instance, before the down beat of m. 86, at the second beat of m. 95, and before the downbeats of mm. 97, 99, 103, 107, etc.

It is crucial that before placing the bow on the “a” string, the student should sense and move the right knee forward to initiate the movement from the pelvis and allow the whole upper body to rotate on the seat bones in a counter clockwise motion. This will allow the student to have a better body alignment in relation to the “a” string where whole passages will be played.

Also, before the student places the bow on the “a” string, he/she might lift the right seat bone of the pelvis allowing all the weight from the upper body to rest on the left seat bone. The student will sense that the weight from the body is concentrated in the left side of the pelvis, allowing him/her to apply more weight on the bow. Now the student can place the bow on the “a” string with the left hand second finger on the “a” string on the note “g”, and find both elbows’ points of balance. The left elbow point of balance will be for a wide vibrato and the right elbow point of balance will be to play with full weight from the right arm to the bow resulting in a loud dynamic.

The right hand will play in fortissimo dynamic most of the time, requiring freedom of all the joints of the right shoulder girdle and arm. The student will have to move the whole right arm all the time to use the amount of bow needed, and the contact point between the right hand’s index finger and the bow has to be engaged all the time to be able to adjust the amount of weight and the bow speed. These adjustments are necessary since the fingers from the left hand make the string either shorter or longer in changing its tension. The student needs to be aware that the higher in register the left hand plays the tighter the string gets, because “the shorter the vibrating
string actually becomes; the shorter the string, the more friction it offers.”

On the contrary, the lower in register the left hand plays the less tension the string has, and it vibrates more freely.

Playing the downbeat at m. 90, the string is about the same size that has been played since m. 86; however, when the student plays the second beat “c sharp” at m. 90, the string will get longer presenting less tension, and at the next downbeat of m. 91, the string will get shorter again.

When the “c sharp” is played, the student should use less weight on the bow and less bow speed, and on the other hand when the downbeat is played on m. 91 the student will need more bow speed and weight on the bow.

At the same time, the string has always to be pressed with weight rather than force from the left upper limb, rather than having the left hand change as the right hand does. The left arm has to get its elbow balance point to the “g” and then to the “c sharp” in order to vibrate with the same intensity on each note.

At m. 95 shifting from “g sharp” to “c sharp” with the third finger, a clean shift will happen if the weight from the bow and speed of the bow are adjusted from the right upper limb. Meanwhile the left upper limb should be in charge of keeping the weight on the third finger and have a good elbow balance point for each note before and after the shift. It is always recommended to be aware of the state of the neck, back, and shoulders during and before the shifting. Also the student should sense either the left or right knees moving forward to follow the bow direction. There should not be any intention of actually moving the knees, but imagining, thinking, and sensing movement will awaken awareness in the pelvis, helping the player sense a connection from the top of the head to the pelvis through the spine.

On the other hand, it is important to be aware of shifting weight on the left hand from the third finger, “c sharp” in m. 95 second beat, to the “b,” second finger in m. 96 first beat because

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12 Alcantara, Integrated Practice, 235.
weight will be constant shifting from the third to the second finger and to the thumb in the following measures. If the fingers do not shift weight between them right after the shift in m. 96, the hand will be tensed for the next five or six measures.

**Use of Different Bow Articulations in Fast Passages**

The following three excerpts are from Johann Sebastian Bach’s (1685–1750) Prélude to the sixth suite. This section will discuss slur arpeggios from mm. 85 to 86, voicing bass and melodic line from mm. 87 to 88, and switching articulations from ascending scale to voicing the moving line from mm. 94 to 95.

**Slur Arpeggios**

Fig. 3.1 J. S. Bach, Sixth Suite, Prélude, mm. 85–86.

From mm. 85 to 86 during the string crossing from the “g” to the “a” strings, the bow should remain on the string while the left hand moves over the fingerboard to play the arpeggios (see Figure 3.1). In the downbeat of m. 85, the student needs to find the right elbow balance point to play the “c sharp,” engaging the contact point. The student will be able to find the right elbow balance point by playing the “c sharp” in sixteenth notes, sensing and feeling a whole motion from the right upper limb. The player can continue playing the next note, “e,” on the “d” string in sixteenth notes, realizing that in order to keep the same sound and freedom from the

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arm, it is necessary to adjust the weight and speed from the bow for the note “e.” Every time the bow switches from one string to another, the right arm elbow balance point will change, and the student will have to adjust it. In addition, switching the bow from one string to another will require starting the movement and letting move the shoulder girdle because it is a whole right-arm motion. The student should keep playing sixteenth notes for the rest of the measure, adjusting the weight and the amount of bow used to produce the same sound quality for every note. Understanding that the elbow point of balance has to be adjusted depending on what string the bow plays, the student can intend to play the passage as written. He/she needs to allow the right elbow to move freely without consciously adjusting it for every single note and use minimum bow with the index finger contact point engaged to produce an even sound. More specifically, the right arm uses the most weight and the slowest speed of the bow. When the bow crosses from the lower to the upper strings, the bow speed will gradually increase along with the arm motion, making a natural and balanced movement for the ascending and the opposite motion for the descending arpeggio.

When the “a” harmonic is played, on the last note of the ascending arpeggio, the contact point between the string, bow hair, and right index finger has to be engaged. Once the note “e” on the “a” string, the first note from the descending arpeggio, is played up-bow, the right arm can do both, applying more weight to the bow and moving downwards from the shoulder to go back to the “g” string. If the index finger contact point gets disconnected from the whole system, the right arm could get tension that can be transmitted to the shoulders, back, and neck. As a result, when the note “e” on the “a” string is played, the tension will not allow the right arm to have time to reengage the index finger contact point with the bow. The bow will remain on the string,
but kinesthetically the contact point will be turned off and the weight will be concentrated in the arm, tensing the right arm’s muscles and joints.

Because of the fast pace of this excerpt, the left hand has to be very light switching weight from finger to finger, the student must keep the whole arm flexible for every shift. Actually, the left hand will be able to move efficiently, because if the right index finger contact point is engaged, the left hand will not have to use so much weight to press the string down. In addition, the left elbow balance point will be lower than usual allowing the whole arm move fast and free. The student should be aware that the left hand and arm move horizontally and vertically, up and down, allowing these movements to start from the shoulder girdle.

**Voicing Bass and Melodic Line**

Fig. 3.2 J. S. Bach, Sixth Suite, Prélude, mm. 87–88.

From mm. 87 to 88 there are two different bow speeds and right arm weights involved (see Figure 3.2). The first sixteenth note needs a fast down-bow speed rather than much weight, and on the following five sixteenth notes, the up-bow will need a slower bow speed and more weight from the right arm. This does not mean that the first sixteenth note from each beat should be played without an active contact point from the right hand. On the contrary, by engaging the contact point with a fast bow speed, it will be easier to change the bow speed for the following five sixteenth notes, and it will help for sound projection as well.

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14 Bach, 89.
The student should feel the rotation or circular motion from the right arm and shoulder when the bow switches from the first beat to the second and so on. Also the student might turn the upper body to the left in counter clockwise motion till the end of that measure by sensing and feeling the right knee moving forward, initiating the movement from the pelvis. In the first note from both the first and second beats, the bow plays the “c” and “g” strings, and the position of the body, both arms, the right elbow balance point, and the bow contact point should be aligned according to those strings. By the third beat the upper body should have turned to get a position for the “a” and “d” strings, aligning both arms, the elbow position, and the contact point for the two upper strings. Then the body will be flexible and ready to play the downbeat of m. 88.

Applying directions to the neck, spine, and shoulders will allow the shoulder girdle to be flexible all the time. For instance, when crossing strings with the left hand, the movement begins from the first joint of the shoulder girdle, and follows through the rest of the other joints in the arm and hand. The awareness of this movement will facilitate the weight shifting from finger to finger if it is necessary. On the contrary, without such flexibility the neck, shoulder, and spine might get tensed affecting the movement and performance from the whole left upper limb.

**Switching Articulations from an Ascending Scale to Voicing Moving Line**

Fig. 3.3 J. S. Bach, Sixth Suite, Prélude, mm. 93–95.

The last beat of m. 93 is a triplet in which the first note is played on the “g” string, the second note is an open “d” string, and the third one is the note “d” played an octave higher, on
the “d” string as well with the second finger (see Figure 3.3).\textsuperscript{15} The student has to consider that, playing the open “d” string, the second note of the triplet, with the string in its loosest state and playing the following note with the second finger on the “d” string as well, the string will present much more tension when it gets shortened to half of its previous length. The student will have to adjust the right arm weight to the bow by applying more weight and bow speed. Once the student plays the high note “d”, anacrusis to m. 94, the student will have to play the following downbeat on the “g” string. When switching the bow from the last note of m. 93 to the first note of mm. 94, 94 to 95 and 95 to 96, the bow should roll downwards over the strings, continuing to engage the contact point, and allowing the whole arm move downwards, initiating the movement from the shoulder girdle and allowing the left knee to move forward. The whole first beat of m. 94 is played in three different strings, the first note in the “g” string, the following four notes in the “d” string, and the last one in the “a” string; each string presents its own degree of tension. The left arm has to engage the contact point all the time, and have the right arm at its heaviest state for the “g sharp” first note of m. 94. Also the weight of the bow has to decrease gradually approaching the “a” string, while the bow keeps the same speed in the three strings. The engagement of the right index finger keeps the contact point, so the student will be able to feel the string resistance. Having the contact point engaged at the time the second beat is played, the student will be able to voice the moving line from the “d” string for the remaining three beats of m. 94 using a small amount of bow with an active whole-arm movement. The student should be aware of letting the parts of the right arm closer to the hand, wrist, and elbow move the most, and the parts farthest from the bow, the upper arm and shoulder, move the least.

The student will notice that both hands are very active, with the left hand’s fingers moving smoothly while the right hand moves the bow with a whole arm motion. Also the student

\textsuperscript{15} Bach, 89.
will sense internal movements and he/she should allow them to happen. However, failure to
sense these internal movements in both upper limbs will affect intonation, sound timber, and
coordination between both hands.

   Last, the student should understand that the fingers from the left hand, including the
thumb, are active only when they play. Releasing the thumb when it is not playing, while the
other fingers are called for action, will give rest to the muscles and increase endurance of the
hand and arm.

   **Staccato Stroke**

   The following three excerpts are from the *Pezzo Capriccioso: Morceau de Concert*, Op. 62 by Pyotr Ilich Tchaikovsky (1840–1893). The first excerpt, from mm. 99–106, will illustrate
the **staccato** stroke in thumb position, the second excerpt, mm. 107–10, will demonstrate the
**staccato** stroke and the constant shifting position, and the last excerpt, mm. 141–43, will show
the descending slide with **staccato** stroke.

   **Staccato in Thumb Position**

   Fig. 4.1 P. I. Tchaikovsky, *Pezzo Capriccioso: Morceau de Concert*, Op. 62, mm. 99–106.
When this excerpt is practiced either slowly or up to tempo the right arm should move all the time from the shoulder girdle, and the index finger contact point must be activated (see Figure 4.1). The student should sense the whole arm motion all the time imagining “the [right] arm as a pendulum moving smoothly and regularly in and out of the shoulder socket having a continuous movement that never stops.” Ideally the student has to be able to keep the same sound quality on every note by adjusting the weight to the bow through the contact point.

Playing the first six notes in m. 99 on the “g” string, the latter presents a certain tension, and a similar aspect occurs when the bow switches to the “d” string. The switching from the “g” to the “d” strings should include rotation or movement from the shoulder girdle; then the student will be able to adjust the weight from the arm to the bow. This is necessary because the “d” string is not as thick as the “g” string, which requires more weight than the “d” string.

If unaware of these adjustments, the student will create a change of sound and color when going from the “g” and the “d” string, and as a reflex, the shoulder will become tight affecting its joints, the neck, and back muscles. This could be the beginning of a chain of reactions that will affect the performance of both upper limbs eventually.

On the other hand, the left upper limb should work independently from the right upper one, making sure that no matter what adjustments the right upper limb does, it does not affect the performance of the left upper limb. The weight from the left arm to the thumb should be used to press the “g” and “d” strings down; however, it should not press both strings at the same time because this will lock the muscles and joints from the hand, arm, and shoulder, diminishing the mobility of the hand itself and affecting intonation. The left thumb will press the string only when it is called for action, only for the note “a” on the “g” string and only for the note “e” on

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17 Maurice Eisenberg, Cello Method of Today, 5th ed. (Borough Green, UK: Novello, 1983), 44.
the “d” string during the first four measures. In other words, the left thumb is going to be used as a pivot, allowing the other fingers to move freely. While the other fingers press the string down; the thumb should remain on the string passively. It is important to realize that the motion from the left fingers should be smooth rather than articulated. The bow will be responsible for the articulation with short bow stroke, while the left fingers move as smoothly as possible.

When the open “a” string is played at the end of mm. 100, no fingers from the left hand should be active. The weight of the left arm should be concentrated on the left shoulder while the open “a” string is played, leaving fingers, hand, and the whole arm free and ready to move. Meanwhile the contact point between the right index finger and the bow has to remind engaged to keep the whole upper arm in balance; loosening or deactivating it will destabilize or unbalance the arm, affecting its alignment to the upper body when the string crosses downwards to the “g” string. At the time the note “b” is played at the beginning of m. 100, the right arm will be unable to reengage its contact point to the bow and string and find the balance point for the right elbow.

In the anacrusis to m. 103, releasing the right shoulder facilitates playing the harmonics with more bow speed and closer to the bridge to obtain enough sound. In addition, when the harmonics are played, the left thumb should be inactive so it will be free and ready to make the shift from the “g” to the “d” string. The passiveness of the left thumb involves the whole arm motion and sensing a movable pelvis will allow the whole body to be included in this shift. The downbeat of m. 103 is also played in thumb position, using the same fingerings used in m. 99. Basically the left hand works as described earlier; however, the student cannot apply the same right arm weight or bow length, or place the bow between the fingerboard and bridge from mm. 103 to 105 as was done from mm. 99 to 102. The passage from mm. from 103 to 105 is mostly on the “a” and “d” strings, and in a higher position than the passage from mm. 99 to 102. Also
from mm. 103 to 105, the strings present more resistance because they are shorter, and at the same time they are thinner, which requires the use of more bow than the previous passage. The strings will respond faster if a little more bow and a whole arm motion are used. If the right upper limb joints, neck, and back are free, the elbow is balanced and the contact point is engaged, and it is easy to decide how much weight is needed.

**Staccato Stroke and Constant Shifting Position**

Fig. 4.2 P. I. Tchaikovsky, *Pezzo Capriceioso: Morceau de Concert*, Op. 62, mm. 107–10.

Practicing in slow motion from mm. 107 to 110, the left hand and arm will move, shifting weight between the fingers, and the fingers will move smoothly without trying to articulate or hit the string (see Figure 4.2). At the same time the right upper limb will have to adjust the weight through the bow, depending on what string is being played and in what position is the bow. During this passage the left hand is constantly shifting downwards from one position to another, and it is important to sense a flexible left shoulder girdle joint that will allow the left hand to shift smoothly. In addition, the student should not focus on the end goal of playing the right notes; he/she will have a better chance to play this passage by being aware of the state of the neck, shoulders, and back, focusing on the right upper limb and letting the left upper limb work freely. If there is a perception of tension in either the neck, shoulders, or back, the student

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18 Tchaikovsky, 2.
should stop playing, inhibit, and send directions; this will help sense what is not working properly and what is the state of the whole body.

**Descending Slide with Staccato Stroke**

Fig. 4.3 P. I. Tchaikovsky, *Pezzo Capriccioso: Morceau de Concert*, Op. 62, mm. 141–43.

![Descending Slide with Staccato Stroke](image)

Lastly, in the downward chromatic scale from mm. 141 to 143, the left hand slides on the “a” string (see Figure 4.3).\(^{19}\) The student could practice the slide from the left hand, awakening the kinesthetic sense by placing only the left hand on the finger board at the highest note of this passage, sliding the left hand, and sensing the right knee moving forward slowly, including the whole upper body during the slide. Also, this passage could be practiced slowly as the third finger stops either on the first note of each thirty-second group, or every nine notes, or every thirteen notes, or every nineteen notes, etc.; sensing a continuous movement from the whole left arm while the right arm adjusts the weight on the bow. For instance, placing the third finger at the highest note, the student can slide from the first note “b” to the “g” natural, then from the “g” natural to the “d sharp,” from the “d sharp” to the “b,” and so on. Also, the same exercise can be practiced by stopping every nine notes, sliding from the first note “b” to the “d sharp,” then from the “d sharp” to the “g” natural, and from the “g” natural to the “b.”

\(^{19}\) Tchaikovsky, 3.
Controlled *Ricochet* Stroke in Thumb Position

The following excerpt is from the first movement of Antonín Dvořák’s (1841–1904) Concerto for Violoncello in B minor, form mm. 158 to 162 and will be used to discuss the controlled *ricochet* (see Figure 5).

Fig. 5 A. Dvořák, Concerto for Violoncello in B Minor, Op. 104, first movement, mm. 158–62.

First, it is important to be aware of a balanced sitting position, head at the top of the spine, which is enlarged from the joint between the skull and spine to the bottom of the pelvis. Then the student should place the left hand on the fingerboard allowing the weight from the left arm to press the string down instead of the fingers. This will keep the left hand flexible to be able to move the fingers, shift, and find a balance point of the left elbow every time the left hand plays a different fingering and position. Also, the student should concentrate the weight from the left arm in the left thumb, using it as a pivot allowing fingers, hand, arm, and shoulder to be flexible and be able to move freely. On the contrary by either using pressure instead of weight or equal distribution of weight on each finger, shifts will fail and tension will be developed in the left upper limb, the shoulder, and the neck. Alternatively, the right hand has to keep equal

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pressure on each string, adjusting the weight and speed on the bow during every shift because of the change of register and find the place for the bow between the bridge and the fingerboard where the student can produce the best sound for the next exercise.

In the following exercise, the student will play sixteenth notes in the three upper strings and for each string he/she has to be aware that the line of gravity and pelvis will move and rotate depending on what string is played. First, the student should align the upper body in front of the “g” string by moving the knees forward, starting the movement from the pelvis to rotate the whole upper body. Now the student can get the left hand ready to play this passage, placing the bow on the “g” string and playing “c sharp,” the third note of m. 158, with the third finger in sixteenth notes several times until he/she finds the best elbow balanced point and contact point from the right upper limb. Once the student is able to play the “c sharp” using a small amount of bow with a whole right arm motion, he/she can switch to the “a” string to play “b,” the first note of m. 158, with the thumb in sixteenth notes, allowing the pelvis and upper body to rotate by moving the right knee forward at the same time that he/she switches the bow to the “a” string. It is important to realize that applying the same arm weight and amount of bow to the “g” and “a” strings, the note “b” on the “a” string will get too much weight, producing a scratchy sound. It is better to use a little more bow and less weight for the “a” string than for the “g” string. Once the right elbow balance point and index finger contact point are found for the “a” string, the student can switch back to the “g” string allowing the upper body to rotate by moving the left knee forward. At this point, it will become obvious that both strings react differently and need a different amount of bow and weight to produce good sound. Finally, the student can try the same exercise on the “d” string and notice the difference among each string. The student is now aware that the right upper limb needs to be adjusted for each string, and those adjustments will be easy.
if the whole upper body is included by allowing it to move every change of string. The student now can play eight sixteenth notes for the “c sharp” on the “g” string, switch to the “g” on the “d” string, to the “b” on the “a” string, back to the “g” on the “d” string, and finally to the “c sharp on the “g” string. The student will notice that every time the bow switches from one string to another, he/she will be able adjust the right upper limb’s weight and amount of bow to engage the contact point with the bow and string.

Practicing the sixteenth-note exercise as explained above is recommended for the left hand’s shifts because when it shifts from higher position to a lower position in m. 159, second beat, or from lower to higher position in m. 160, first beat, both upper limbs have to be adjusted accordingly. The left hand needs less weight to press the string down in the second beat of m. 159 because the strings present less tension than at the beginning of the passage, m. 158 first beat. At the same time from the second beat of m. 159, the right hand needs less amount of bow for all three strings. When the shift is practiced between the fourth beat of m. 161 and the downbeat at m. 162, the tension of the strings is considerably higher and the right hand will need more weight and more bow, while the left hand will need enough weight from the arm to press the string down but with the strings not touching the finger board.

Finally, the student should try to play the passage as written with ricochet stroke, keeping his/her attention on the horizontal movement from the right arm instead of the upward and downward movements from the bow, and keeping an engaged contact point. The student should not think moving the upper body as it was explained in the sixteenth-note exercise. However, it is recommended to align the upper body to the “d” string and be aware that the whole upper body has to remind flexible. In addition, the cellist and teacher Joachim Stutschewsky suggests that “the use of bow should be reduced to a minimum. The action of changing over the string is
initiated at the shoulder…the first note in the down bow as well as in the up bow is vigorously accentuated in order to allow the stick to spring on by its own impulse.\textsuperscript{21}

**Double Stops**

The following two excerpts from David Popper’s (1843–1913) High School of Cello Playing, Op. 73 will illustrate the application of the kinesthetic sense playing double stops. The first excerpt, from etude no. 17, will explain the kinesthetic awareness for both upper limbs playing double stops and string crossing, and the second excerpt, from etude no. 34, will show how to sense the change of tension in the strings while shifting double stops (see Figure 6.1).\textsuperscript{22}

6.1 D. Popper, High School of Cello Playing, Op. 73, etude no. 17, mm.1–2.

The student should place the bow on the “c” string, sense the balance point from the right elbow, and engage the index finger contact point by letting the weight of the right arm sit on the bow. Once playing the open “c” string, the student will shift the bow to the “a” and “d” strings by rolling it over the strings, while keeping the index contact point engaged and stopping the bow on both upper strings. The student should sense the right index finger engaged and the elbow balanced for both strings. In other words, when the bow shifts from the “c” to the “d” and “a” strings, it has to remain on the string without diminishing the right arm’s weight on the bow and keeping a good contact point between bow and strings. Switching the bow to the “a” and “d”


strings, the student should allow the right shoulder girdle to move along with the bow, which has to be always connected to the strings preserving the bow arm in a balanced state. In playing double stops, the tension on the strings and the adjustments from the arm will be twice as much as playing a single note. In the end, it will be possible to play the double stops up-bow without any difficulty by adjusting right arm weight and bow speed.

The following exercise will help sensing how to adjust the right arm weight and bow speed playing double stops. The student should play in *forte* dynamic the first double stops, the “c” and “e flat” in sixteenth notes as many times as necessary, moving the whole right arm, engaging the contact point from the index finger, sensing the elbow point of balance, and using the necessary amount of bow to engage the whole right upper limb. Then the student can proceed switching to the second double stop, on the notes “f” and “d” without stopping the motion from the right arm. It is important to sense and listen for the same quality sound in the second double stop as the first one, and this is possible by adjusting the weight from the right arm and the speed of the bow. These adjustments are very small, and they are necessary to maintain the same sound, timbre, and good intonation. Then the student can play the third double stop, the notes “g” and “e flat,” adjusting the bow speed and right arm weight on the bow as well.

After being able to play the first three double stops as written in one bow either up or down-bow, the student will immediately sense and understand that adjusting the right arm weight and bow speed are necessary to have a comfortable and balanced right hand to sustain a melody. Once the second beat is played, the whole right upper limb needs to be dropped, keeping the contact point engaged to play the “c” string in the third beat. The student can then proceed to play the next three double stops.
Before playing the second measure as written, it is recommended to play every single double stop in sixteenth notes as described above, sensing, feeling, and adjusting the weight and speed of the bow for each double stop.

At the same time, the student has to be aware that the left hand and arm work differently than the right hand and arm. When the bow plays the down-beat, open “c” string, the left hand must be ready to play the first double stop by having the weight from the left arm concentrate in the shoulder. The left fingers could be on the strings without pressing the string down while the left arm is suspended or floating. Once the bow gets to the “a” and “d” strings, the first and third fingers of left hand can be activated by letting the weight transfer to the fingers through the arm pressing the strings down while the left thumb and wrist are passive. The student should be aware that in double stops one finger gets more concentration of weight than the other. Claude Kenneson suggests that “in double stops the lower-numbered finger…should be the mobile point of balance,” and the student should find the elbow’s balance point in accordance of the lower-numbered finger. In case of “a shift of the double stops from one position to another, it is the mobile lower-numbered finger that assumes the responsibility of the balance.”

The left elbow point of balance has to be adjusted for every double stop, and the balance depends on the lower-numbered finger, string, and register. Shifting from the first double stop to the second one, the left arm and hand will move if letting the shoulder girdle free. The left arm then will get a specific elbow balance point by way of permitting it to hang or float, and balancing it according to the lower-numbered finger. Playing the double stop with the first finger on the “d string” and the third finger on the “a string,” the left elbow’s point of balance will be focused on the first finger. The same procedure will happen for the second and third double stops.

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24 Ibid.
stops; on the notes “f” and “d,” and “g” and “e flat,” the left arm and elbow should find their balanced position based on the first finger for the second double stop and the third finger for the third double stop. Therefore, the lower-numbered finger should receive the weight from the left arm to press the string down, and the upper-numbered finger presses the string with less weight.

Sometimes the student is unable to sense how to switch the weight from the left hand when shifting from the first to the second double stops, or unable to sense how the strings present different tensions on the first and the second double stops. To overcome this, the teacher can suggest to the student the following exercise to practice the first two measures from Popper’s etude no. 34 (see Figure 6.2).

6.2 D. Popper, High School of Cello Playing, Op. 73, etude no. 34, mm.1–2.

First, it is recommended to play the first double stop in sixteenth notes and pay attention to shifting the weight from left hand when moving from the first to the second double stop and adjusting weight and speed of the bow at the time the second double stop is played. Once the student can play the first double stop, the “f” and “a,” with both upper limbs balanced and focusing the left arm weight on the lower-numbered finger, the second finger, he/she can proceed to play the second double stop, “c” and “a,” with the first and the third fingers. The first finger will be responsible for balancing the arm and this finger will give direction to the left hand during the shift. Also, the student will have to adjust the weight and bow speed to keep the

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25 Popper, 72.

26 Kenneson, 78.
same dynamic, sound quality, and timbre between the first and the second double stops. Otherwise, the second double stop will sound out of tune, and the whole right upper limb, shoulder girdle, and even the neck will become unbalanced and tense because of the lack of weight from the right limb.

**Voicing Double Stops**

The last excerpt is from the second movement, *Sardana (Danza)*, of Gaspar Cassado’s *Suite per Violoncello*, and will focus on the application of the kinesthesia playing double stops with a moving voice while the other voice is sustained (see Figure 7).

weight. In addition, the student will have to adjust the weight and speed of the bow to shape the moving line on the “d” string, which requires a greater amount of bow and weight on the ‘d’ string, and hardly playing the “a” string.

Focusing on the “d” string, trying not to play the “a” string so loud, playing the right pitches, and shaping the line of the moving voice, might create tension in the upper body. Instead of focusing on the end goal, the student should be fully aware of the state and the alignment of the body, and the harmonious relationship between the neck, shoulders, and back. That will give additional opportunities to switch weight from finger to finger on the left hand and sense the right arm’s weight on the “d” string to voice the moving melody.

The student might need first to practice the left hand by itself, then include the right hand playing only on the “d” string, and finally add the “a” string. Every step of the way, he/she will have to prepare him/herself by awakening the kinesthetic sense, inhibiting, and or practicing belly breathing to be fully aware of the state of the body. As a result, the brain will create the necessary mapping and planning relationships to perform solid moving patterns in a balanced way.

Understanding the application of kinesthesia for the upper limbs in selected excerpts from cello literature allows any cellist to realize that the whole body has to be always involved in any movement or action. The different kinesthetic function of the upper limbs can not be overestimated. The bilateral and quadrilateral dialogs or collaborations between both upper and lower limbs are necessary and need to be present all the time in cello playing. At the same time, the upper and lower limbs should not influence each other because their individuality is the most important part of their performance if the student wants to achieve successful movements and tasks. Having the kinesthetic sense awakened during practice and performance gives any cellist a
high level of body awareness and attention that help improve technique, memorization, self-confidence, intonation, and musicality.
Conclusion

Understanding how the upper body works anatomically, sensing the state of the body and movements, being conscious of breathing before and during playing, and letting the body react organically will assist in awakening, refining, and developing the kinesthetic sense. Any cellist should sense and be aware of movements, relationship between upper and lower limbs, muscle and joint state of tension and relaxation, and alignment of the upper limbs with the upper body, including the upper limbs placement on the cello, functionality, and point of balance. By understanding concepts from the three somatic methods, the Alexander Technique, Feldenkrais Method, and Yoga, and practicing exercises and lessons included in this document, students will comprehend that by solving technical issues and having a well-balanced body and awareness of movement, their instincts and musical knowledge will be projected through their playing.

Also, this research will assist professors to understand that complete teaching, rather than coaching teaching, is mandatory to educate students with solid cello technique and profound understanding of kinesthetic awareness. The latter will improve students’ way of playing and technique, helping their understanding that cello playing is a physical, aerobic, intellectual, and musical activity in which any technical difficulty is related to the basics of playing. Each chapter will help any cello professor harness the kinesthetic sense to be a better teacher and his/her students to be better cellists and musicians. Cello professors must make students understand how the body works from the muscular-skeletal system point of view, and what it is supposed to happen outside and inside of the body while playing and practicing the cello.

The information provided in the first chapter about the kinesthetic sense and its influence on the memory can not be overestimated for its practical use during practicing and performing. Also the discussion in the second chapter is relevant because body mapping specific parts of the
body and letting the body react will awaken the kinesthetic sense. By applying this awareness in cello technique and playing, one can have the choice to improve poor movements and faulty sensations that affect skills and performance.

In the third chapter, there is valuable information about the sitting position and kinesthesia that is rarely included in cello treatises, methods and books, probably because the sitting position is either taken for granted, or is underestimated or badly understood because of lack of information. In the sitting position, the upper body should remain flexible and ready to react all the time, keeping an elegant relationship among the head, neck, and back. This is necessary because many solutions of playing issues are related to the cellist’s way of sitting and holding the instrument.

The information and exercises discussed in the fourth and fifth chapters can guide any cellist to realize that playing is an experience that reveals a series of comfortable and supported movements that can improve technique. Therefore, developing and refining the kinesthetic awareness and understanding concepts from the somatic studies covered in this document, cello professors and students will be able to apply that information to cello literature and resolve technical issues that limit cellists’ ability to express emotions that can be projected during performance. Finally, I hope that this document helps and guides any cellist to have an intelligent and balanced way of playing and a fluid yet conscious control of movements during performance.
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