

# *Uri Vardi's Cello Fundamentals*

Influenced by János Starker and the Feldenkrais Method®



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## Foreword

I am pleased to share with the reader/viewer my thoughts on the essential elements necessary for the mastery of healthy and dependable cello playing. These thoughts have evolved during fifty years of teaching. I continue to gain a deeper and deeper understanding of these elements.

Throughout my professional career, I have performed as a recitalist, soloist, and chamber player in the United States, Europe, South America, South Africa, Asia, and my native Israel. I was born in Szeged, Hungary and grew up on kibbutz Kfar Hahoresh, Israel. I studied at the Rubin Academy in Tel Aviv, was an artist diploma student at Indiana University, and earned my Master's degree from Yale University. My cello teachers have included János Starker, Aldo Parisot, Eva Janzer, and Uzi Wiesel, and I have studied chamber music with Ramy Shevelov, Rachel Adonaylo, György Sebők, and Loránd Fenyves. I have recorded and toured with the Israel Chamber Orchestra and was a founding member of the Sol-La-Re String Quartet. I have served as assistant principal cellist of the Israel Chamber Orchestra and principal cellist of the Israel Sinfonietta.

In 1990, following an extensive teaching and performing career in Israel, I was appointed Professor of Cello at the University of Wisconsin-Madison. In addition to my work at Wisconsin, I have taught and conducted master classes at several music schools, including: Juilliard, Eastman School, New England Conservatory, Indiana University, Yale University, Oberlin College, Cleveland Institute of Music, University of Iowa, Ohio State University, Geneva Conservatory (Switzerland), Paris Conservatory (France), Tunghai University (Taiwan), Bartok Conservatory (Budapest, Hungary), and the Jerusalem Music Center (Israel).

In recent years, I have initiated four major projects.

- *The St. Petersburg School* – Music for Cello. In the St. Petersburg project, I researched, performed and recorded (with pianist Uriel Tsachor) compositions written by Russian-Jewish composers, many of which had never been previously recorded. In 1977 Beth Hatfutzot (the Diaspora Museum in Tel Aviv) released the recording on a CD, which was favorably reviewed by the Jerusalem Post.
- *Fusions*, a chamber music project sponsored by the University of Wisconsin-Madison and the Consulate General of Israel in NYC. *Fusions* was a chamber music project of Jewish music and

Arab art music, culminating in a commissioned *Trio for Oud, Cello and Piano*. In this project, I collaborated with Oud artist Taiseer Elias and pianist/composer Menachem Wiesenberg. The project toured Israel and the U.S and was positively reviewed by major newspapers such as the Washington Post and the Boston Globe.

- The success of the *Fusions* project was the inspiration for the commission of *Forty Steps*, a double concerto for cello, oud and symphony orchestra. In 2007, Joel Hoffman composed *Forty Steps* for Taiseer Elias and me. It was premiered in March 2008 with the Madison Symphony.
- *The National Summer Cello Institute Workshop*. The National Summer Cello Institute (later renamed to *Your Body Is Your Strad*, and expanded to include violin, viola and piano) is a unique program exploring the relationship between body awareness, creativity in performing and teaching, and prevention of music-related injuries. This Institute is geared towards professional and graduate string and piano players.

My students have been successful as soloists, chamber players, faculty members of major music schools, and members of major orchestras.

In my teaching, I put a great emphasis on the relationship between movement and sound. In order to further my understanding of this approach, I have specialized in the Feldenkrais Method, for which I received the 1999 UW-Madison Arts Institute Faculty Development Award. I completed a Feldenkrais Practitioners Training and in 2003 was certified by the Feldenkrais Guild of North America and by the International Feldenkrais Federation as a Feldenkrais practitioner. For several years, I have been teaching a Feldenkrais for Performing Artists course at UW-Madison. I was awarded the UW-Madison Arts Institute Emily Mead Baldwin Award to create a program for somatic education in the performing arts at UW-Madison.

I believe that my principal role as a teacher is to help my students become aware of who they are and to help them grow. It is not to define their faults nor cure them. The driving force in this process is my curiosity about the unique makeup of each of my students. As a cello teacher, I not only challenge my students to understand the intentions of each composer, I also help them to explore their inner world, and to express their unique voice within the context of the composition. Most of the learning occurs in the process of working towards a musical goal.

When I teach a musical composition, I often guide my students to attend to their habitual ways of musical expression. Musical expression encompasses the whole range of human emotions. Although the exploration of expressive nuances does not necessarily lead directly to the ultimate mastery of a composition, it frequently results in the expansion of the student's personality and music-making abilities.

This way of learning is organic rather than linear. Instead of setting concrete, simple goals and learning the prescribed tools to attain them, in organic learning, the experimentation with different ideas provides the student with the freedom to choose among a whole array of options for expressing a musical intention. The same principle of encouraging the search for a variety of options applies to the technical mastery of the musical instrument. In order for my students to gain the ability to meet any composition's demands, they must have a vast repertoire of movements that will give them the freedom to use their bodies with maximum efficiency.

Most of us accept the ways we move as if they are a part of our genetic makeup, whereas in reality, we learned to move by trial and error, and our nervous system is wired according to our experiences. Unless we are challenged to question this wiring, and to explore new possibilities of movement, we limit our range of expression. I constantly challenge my students to explore new ways of moving while playing, and to correlate them with minute differences in the quality of sound. Through my experience, I have found that when students discover the power of becoming aware of minute differences in their movement, it is not only their sound that changes, but also their coordination, and overall technical proficiency.

For me, the most fascinating aspect of this approach is that my students come to not only discover their personal involvement in the communication of a musical composition, and their ability to efficiently express it on their instrument, but they also very often gain self-confidence and imagination. The benefits of body awareness also help them in the prevention of injury, and in the healing after a disabling injury.

Uri Vardi

## Important Considerations When Using Somatic Based Instructional Methods

These lessons emphasize the powerful potential of somatic learning, which includes attention to gravity, proprioception, spatial orientation, and tactile input, (i.e. touch). Somatic learning is of equal importance to intellectual and aural learning when playing an instrument, but it is of utmost importance to emphasize the need for great care and attention when implementing such an approach with students. Physical touch must be conducted with unambiguous intention, and both the teacher and the student need to understand its pedagogical goal. It is important to explain the role of tactile instruction and to get the student's permission to utilize it. Just as heightened awareness while playing an instrument is a key tenet of this teaching method, so is heightened awareness on the part of the teacher when interacting with students in a tactile manner.

## Lesson 1: Developing a Solid and Flexible Foundation

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*This lesson is focused on finding a balanced and adaptable foundation for cello playing.*

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### **Key Concepts**

- Effective posture (solid foundation) is not static. Thus, it is more appropriate to define the setup for playing as active posture (Acture).
- Moshe Feldenkrais: “Acture is the minute adjustments that individuals make in order to correct their posture constantly in daily life.”
- The goal is to attain stability without rigidity. **Rigidity** is a manifestation of the inability to move freely (feeling stuck). **Flexibility** is the ability to move at will in any direction with the least amount of effort and friction.
- The four “points” to attend to when looking for a solid/flexible foundation are the two feet (mostly at the heels) and the two sit bones. Once the relationships between these points become clearer, the potential for effective, free movement expands.
- A clear contact between the feet and the floor allows power to travel to the pelvis and lower back, and subsequently to the arms and hands.
- Movements rely on using the skeleton in an organized and efficient manner. The skeleton is what carries the movements in the body.
- Muscles are the tools for movement. When the skeleton lacks efficient organization, the muscles are the next available means for stabilization--they essentially become rigid (functioning like the bones) in order to support the skeleton.

### **Exercises for Application**

- Attend to the two sit bones. Feel how they are aligned. If one sit bone feels heavier, make it even heavier. It is advantageous to first follow the natural tendencies of one's system, and to be aware of what one is doing when allowing that sit bone to become heavier. Is the entire torso (including the shoulders) being tilted in that direction, or is it only the pelvis that is being tilted, underneath the torso? Try to make that seat bone heavier using both approaches (tilting of the entire torso vs. tilting of the pelvis only). Do the same with the other sit bone. Observe whether the general sensation of weight distribution on the chair has changed.
- Attend to your heels. Move your feet further away from the chair, then bring the heels closer to the front legs of the chair. Look for the place where the heels and feet can give you the greatest stability, sense of weight, and support.
- Exert weight on the right heel and direct the force diagonally to the left sit bone. Feel the passage of force, and let go. Do the same with the left heel and right sit bone. Then try left heel/left sit bone, right heel/right sit bone; these relationships might feel less clear. Awakening the different connections among these four points can result in a more sensitive/flexible foundation.



## Lesson 2: Source of Power

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*This lesson is focused on finding and utilizing the body's center of power in cello playing.*

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### **Key Concepts**

- The center of power in the body is located around the pelvis and lower back. Kinesthetic awareness of this power center is essential for one's ability to use power efficiently and effortlessly, and direct it where it is needed during playing.
- One of the greatest challenges for a cellist is learning to improve the passage of force (power) from the reservoir in the lower center of the body to the playing apparatus (arms, hands).
- Initiating power from the center of the body reduces the torso, shoulder, neck, and arm tension that often occurs when one attempts to produce loud sound.
- One can spend one's entire life improving the fluidity of movements in the body. Smooth movements are all about getting from one position to the next "molto legato." It is important to make sure that everything during the movement is on a continuum (every change is prepared/anticipated) to avoid abrupt changes.
- A loose/"whatever" mindset is a state of flexibility in the body. This attitude is often evident in jazz musicians. They are constantly in this "whatever" place. It's a great place to be in, rather than being concerned about doing everything right.

### **Exercises for Application**

- In pairs, one partner makes a soft fist and places it in the center of the other partner's lower back. The partner who is being touched pushes the fist away with the power of the muscles of that area alone. It is important to feel the point of contact and figure out how much power is available there to push the force of the fist. One should not analyze, but simply observe the sensations. The goal is to find the power in the lower back, and use it efficiently.
- Shift from a sitting position on the chair to a standing position. When sitting, pay attention to the distribution of weight. Attend to the heaviness on both sit bones and the relative lightness of both heels. When transitioning from a sitting to a standing position, look for a way to shift that weight "molto legato" from the sit bones into the heels until the sit bones become so light that the pelvis lifts from the chair. Observe whether there is any tightness in any part of the body, or a tendency to stop breathing during this slow/fluid transition. Gradually return to the sitting position "molto legato" as well, shifting the weight from the heels to the sit bones while allowing the knees to bend slowly. Attend to the shoulders and be aware of any tension there. Be aware of what your head and neck are doing during this process.
- Sitting at the cello in playing position, be aware of the sit bones and lower back. Use support from the lower body to prevent the muscles from acting as stabilizers. Observe where the head is. Turn the ear sideways so that it becomes closer to its corresponding shoulder (on both sides) and notice how it feels (is there one side that feels easier to bend?). Observe how this motion affects the sit bones, heels, etc. Now, just observe the nature of the sitting position (is there a difference in the sensation?). Quickly transfer weight back and forth between the sit bones with minimal effort. See if this motion affects the head movement.

These exercises awaken the awareness necessary for creating a solid and flexible playing foundation.

## Lesson 3: Sensing Weight

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*This lesson addresses the interpretation of weight on a kinesthetic/sensory level, and understanding the difference between weight and pressure.*

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### **Key Concepts**

- **Leaning** is an application of weight, a sinking sensation; **pressing** is a sensation of force produced by muscles.
- When **leaning**, the whole system goes in one direction. When **pressing** (or squeezing), part of the body goes in one direction and part of the body goes in the opposite direction. The tension between these two opposing parts creates the pressure.

### **Exercises for Application**

- In pairs, one partner is seated and the other partner is standing. The standing partner puts both forearms lightly on the seated partner's shoulders, and alternates between **leaning** with the entire body into the forearms, and **pushing** down the forearms using the power of the arm muscles. Both partners become aware of the different sensations caused by these two actions. It is helpful for the partner who is receiving the leaning vs. pressing to offer feedback if the difference between the two sensations is not clear.

It is helpful for the standing partner to bend the knees while leaning; this helps to direct the weight into the forearms.

- In pairs, both partners stand, and one partner places soft, supporting palms on the other's shoulder blades. The partner being supported leans backwards into the other's solid and supporting palms and attends to the restful sensation of using the entire body weight to accomplish the action. Next, the partner being supported uses the muscles of their upper back and chest area to push away the supporting palms of the other partner. This exercise can also serve to clarify the difference in sensation between leaning and pushing.

## Lesson 4: Bow Arm Weight and Pronation

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*This lesson explores the sensation of pronation. Pronation, a rotating motion of the arm, allows one to transmit the arm's weight into the upper half of the bow. This motion generates "artificial weight" and sustains the sound in an area of the bow where it would otherwise taper.*

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### **Key Concepts**

- **Emanuel Feuermann (quoted by Seymour W. Itzkoin):** "As obvious and superfluous as it may seem to mention it, it is my opinion that the basic ill of poor playing lies in the absolute disregard of natural laws."
- The entire arm *rotates* to achieve pronation. Rotation happens in the joints.
- The bow is heavier at the frog and lighter at the tip, and the arm is heavier when it is closer to the torso and lighter when it is suspended away from the torso. Because of these attributes, one will lose power in the upper half (or compensate by squeezing) if one does not generate power via pronation.
- Often, the tendency is to initiate the rotation from the wrist rather than the entire arm.
- It is useful to notice the involvement of the shoulders and the chest when generating the rotation necessary for pronation.

### **Exercises for Application**

- Place the bow on the string in the middle of the stick, and rest your palms on both ends. Very slowly lean into the stick through the arms, exerting weight on the strings. Experiment with different heights of the elbows and feel how this affects the application of weight. Bounce with your lower back and see how it affects the application of weight on the bow.
- Hold the bow at the tip with the left hand, and place the other end (the frog) on the string. Apply the weight of the right arm through the hand into the frog. Watch where your right elbow is, and whether the entire weight of the arm is effectively transmitted into the bow.
- Put both arms straight in front of you and bring the palms to face the ceiling; this is supination. Keeping the arms straight, bring the backs of the hands to face each other; this is pronation. Notice what part of the arm is initiating the rotation. Practice starting the motion with the hand. Then, start the motion from the area around the elbows, and then from the shoulders. Notice what happens around the chest bone. If the shoulders can move very freely, the elbows will go upwards when rotation occurs.

## Lesson 5: Bow Hold

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*This lesson addresses the principles for forming a natural “bow hold”.*

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### **Key Concepts**

- It is essential to maintain the natural shape of the hand when holding the bow. Trying to conform the hand to a certain predetermined shape causes tension and rigidity.
- A rotation of the bow arm will allow the thumb to reach a place of security at the frog, allowing for the hand to maintain its natural shape. The thumb should not be forced into place by its own muscles; this will impede the connection with the arm and cause tension.

### **Exercises for Application**

- Hold the bow at the tip with the left hand and allow the right hand and forearm to hang downwards. With the left arm/hand, bring the bow to touch the hanging right hand. Then, move the bow in a horizontal motion so that the entire stick passes back and forth through the right palm. Pretend that the right hand is lifeless; completely ignore what the left hand is doing with the bow. Then, move the bow with the left hand so that the right hand reaches its usual position at the frog.

Place the bow on the string and allow the fingers to hang lazily downwards. Notice if the second finger is pretty much around the “ring” (silver) on the frog. Pull the arm backwards from the shoulder blades until the fingers touch the stick where they normally would. Lean with the arm into the bow (which is still resting on the string). Practice “bouncing” with your lower back to check if you are effectively transmitting the weight from that area into the fingers.

- Lift the right arm, and look which finger your thumb naturally faces (try to forget how you usually hold the bow). For most people, it will be more or less opposite the first finger.

Place your right hand on the frog once more. Pull the arm backwards from the shoulder blades, place the thumb on the stick where it naturally falls (approximately opposite the first finger area) and don't move it anywhere it is accustomed to. The pronation of the arm allows the thumb to slide into the groove of the frog. This approach prevents contortion of the hand's natural shape.



## Lesson 6: Bow Path

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*This lesson addresses tools for developing a bow path that is perpendicular to the string,  
and the parts of the right arm that must be active in each part of the bow.*

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### **Key Concepts**

- In order to achieve the richest sound, the bow needs to “cut” the strings at a perpendicular angle. The right arm must move in a particular path that will maintain this angle. If a player has the ability to maintain a perpendicular angle between the bow and the string, they can subsequently change that angle at will in order to achieve a desired sound or expression.
- In the **lower third of the bow**, the **upper arm** initiates the motion. Specifically, the inside of the upper arm gets closer to the rib cage when moving towards the frog and further away from the rib cage when moving towards the tip.
- In the **middle third of the bow**, there is movement in both the **upper arm and forearm**. The forearm moves horizontally (around the elbow hinge) and the upper arm moves more vertically. Together, they create a multidimensional (circular) movement instead of moving the entire unit on one plane.
- In the **upper third of the bow**, the movement is mostly done by the forearm. If the wrist is not stabilized at this part of the bow, contact with the string is lost. The upper arm rotates naturally in order to sustain the sound.
- Shoulders are anatomically very complicated joints. There is a lot of emotional protection in this area; there is a culturally-induced tendency to avoid “exposing” the armpits. This tendency causes the muscles around the shoulders to tighten in order to prevent too many “exposing” movements. It is important to notice these tendencies and to challenge them in order to achieve more freedom in this area.

### **Exercises for Application**

- Experiment by bowing with an acute angle, then switch to an obtuse angle, and then a perpendicular angle. Listen for the differences in sound production between each angle.
- **Tortelier Exercise (adapted by Vardi):** hold the bow at the frog with the left hand (tip pointing to the right, so the usual position of the bow is reversed). Place the right hand close to the frog, leaning into the stick (the way you would hold the bow naturally). Slowly move the right arm along the stick. Lean into the stick with loose and solid fingers, keeping a normal “bow hold”. Feel the arm weight applied onto the stick through the right index finger. Allow the arm to pronate as you proceed towards the tip. This exercise teaches the arm to move in the path that will maintain the perpendicular angle of the bow.

Move the bow along the D-string normally, and observe whether the arm is moving the same way as it did during the Tortelier exercise. Make sure the feet are planted; remember the four points (two sit bones and two heels).

## Lesson 7: Bow Distribution

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*This lesson introduces tools for developing a clear understanding of bow distribution principles.*

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### **Key Concepts**

- The ability to move the bow at an even speed allows the player to change that speed at will for musical purposes. Varying one's bow speed is an important expressive tool.
- In order to achieve effective bow distribution, it is necessary to have clear parameters for the motion, and to be able to understand them on a sensory level.
- A common tendency is to move the bow quickly (at a high speed) at the beginning of a note.
- **Ödön Partos (violinist)** taught an exercise using grooves to practice control of bow distribution. A groove refers to the act of gradually sinking weight into the bow at a given point. Creating a different number of grooves along the bow (where the bow keeps sinking and releasing) allows the player to achieve more control and freedom in the use of the bow speed.
- Effective bow distribution requires a clear sense of pulse.
- In order to control the bow speed and change it at will, it is necessary to have a clear sensory understanding of what constitutes even bow speed.

### **Exercises for Application**

- First make one groove in the middle of the bow. If done correctly with a natural application of weight, this should look like a **U** shape, rather a **V** shape (which would result from an abrupt, vertical motion). The bow stick gets closer to the hair, and then returns to its normal distance. Be sure to effectively release the stick at the end of the groove. See if the stick can approach the hair in a vertical motion (straight down), as opposed to an angular one (where the side of the stick gets closer to the hair). Then make two grooves per bow, so that the bow is divided into thirds. Keep adding more grooves and continue to divide the bow accordingly.
- Using a metronome, make the grooves in rhythms (eighth notes, triplets, etc.) with progressively faster tempos.

## Lesson 8: Left Arm Weight (1)

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*This lesson focuses on the sensation of transmitting left arm weight into the fingerboard.*

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### **Key Concepts**

- To prevent squeezing and forcing with the left hand, the weight of the left arm ought to travel through the forearm into the left hand and fingers, bringing the string down onto the fingerboard.
- If the left elbow is touching the side of the cello, the arm weight will be transmitted into the side of the cello and not into the fingerboard, forcing the hand muscles to press the string down.
- **Proprioceptors** are sensory nerves that are located in muscles, tendons, and joints throughout the body that furnish information concerning movements and positions of the limbs, trunk, head and neck.<sup>1</sup> It is highly recommended to notice the cues given by the proprioceptors, and to heighten one's sensitivity to those cues.

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<sup>1</sup> <https://www.sports-health.com/glossary/proprioceptors>

### **Exercises for Application**

- Put the left forearm on the fingerboard at a comfortable place. See how the weight of the forearm is applied. Due to the slope of the cello, the upper part of the body needs to be organized in a way that will prevent the arm from sliding downwards towards the bridge.
- See if the forearm can be secured (without tightening the shoulders) so that it will lean into the fingerboard without sliding down. It is necessary to develop this ability in order to prevent excess force.
- In pairs, have one partner lift the cello by the endpin so it is perpendicular to the body. Observe the sensation of applying the weight of the left forearm on the string in this position; this is what violinists (and violists) feel when they play. Notice how the arms rotate when changing from a flat surface (when the cello is perpendicular) into a sloped surface (when the cello is held normally).

## Lesson 9: Left Arm Weight (2)

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*This lesson focuses on the facilitation of weight transfer from the upper left arm into the fingers.*

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### **Key Concepts**

- To avoid a tendency to squeeze, it is necessary to develop the ability to transfer the left arm's weight into the hand and fingers.
- An attention to elbow height is particularly important when exploring this concept.
- Acquiring the ability to transfer the weight requires a somatic/sensory understanding and not a cognitive/intellectual one.
- Most people have a natural tendency to squeeze/press on objects; once this tendency is observed and challenged, greater freedom of movement is possible.

### **Exercises for Application**

- In pairs, one partner places a supporting hand under the other's elbow, and both partners sense the arm weight. The supporting partner places his/her hand under the forearm and the supported partner shifts weight from the elbow area into the supporting hand, trying to avoid tension in the shoulder. The supporting partner now places a soft and firm fist under the other's firm wrist and waits for the supported partner to allow a shift of weight into that area. It is of utmost importance to notice whether there is pressure added while shifting the weight. The supporting partner places the other fist inside the supported firm palm, and finally supports the tips of the fingers, which absorb the weight. Throughout this exercise, it is important that the supporting partner waits to change their area of support until they can sense their partner's clear shift in arm weight.
- It is good practice to make a fist and solidify the wrist without becoming stiff.
- This is just an introduction; this skill can be upgraded constantly. The clearer the concept of weight transfer becomes to the system, the easier it gets to obtain freedom and ease of motion on the fingerboard.



## Lesson 10: Application of Left Arm Weight on the Fingerboard

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*This lesson focuses on finding an optimal left arm height for transmitting arm weight into the playing fingers.*

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### **Key Concepts**

- The joints in the body are meant to smoothly transfer force into the bones. If the joints are too floppy, it is hard to transfer the force from one place to the other.
- Around every joint, there are muscles. There are many ways to train those muscles to contract when stabilization of the joint is needed, even if one is double-jointed.
- Quite often, solidity of the joints is required, but the difference between solidity and stiffness must be distinguished and defined on a sensory level.

### **Exercises for Application**

- Loudly play the G harmonic (around the neck of the cello). Imagine that the elbow is pointing at the finger playing the harmonic. Shift the weight of the arm into the playing finger while keeping the thumb loose on the back of the neck. When applying weight on the fingerboard to bring the string down, make sure that the fingers are not squeezing. Alternate between the harmonic note and the solid note. When the harmonic is played, the arm will feel lighter and higher. The lowering of the entire arm is the action used to bring the string down. If the elbow goes too low, the weight will be transferred into the elbow, forcing the finger to press.
- It is helpful for the teacher to demonstrate the difference between lightness and heaviness on a student's arm, so they may see what the fingerboard is "experiencing".

## Lesson 11: Function of Left Arm in Relation to the Fingerboard (Planes of Movement)

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*This lesson addresses the three planes of left hand/arm movement.*

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### **Key Concepts**

- An economical movement of the left hand along the strings from the lower register to the higher register requires that the height of the elbow will not change much. It is disadvantageous to change from a low elbow to a high elbow when moving into three-finger positions. It is a good idea to think of the fingerboard as a continuous plane rather than a valley followed by a mountain.
- To allow for a consistent level in the upper arm/elbow, the shoulder needs to rotate very freely.
- The left arm deals with three planes in relation to the fingerboard: Along the string (shifts); vertical plane (movement of the fingers up and down); horizontal plane (movement of the fingers between the strings). The horizontal plane tends to be the most neglected one among cellists. For each of those planes, it is important to observe how much of the body is considered as part of the fingers (where do the fingers start?).

### **Exercises for Application**

- Place the hand in first position and slide along the fingerboard, checking that the height of the arm doesn't change much. Engage the arm all the way from the lower back. Feel the ball of the shoulder moving freely inside its socket. Solidify the wrist so that the entire arm is moving up and down, not the hand and the wrist. In every position, the sensation of leaning on the arm changes because the arm is in a different place.
- Without vibrato, play E in first position on the D string. Drop the second finger by rotating the hand. To compare, drop the same finger without rotating. Observe the difference between dropping and rotating. Avoiding excess rotation is key to achieving economical and precise function of the fingers.
- With the hand in closed (half-step) position, place each finger on a different string (1 on C-string, 2 on G-string, 3 on D-string, 4 on A-string). First, do this using the hand muscles only. Then, allow the whole arm to guide the fingers across the strings. Observe the differences between the two actions. When changing strings, place the left hand finger on the new string ahead of the bow. This approach to string crossings is neglected quite often.

## Lesson 12: Building Hand Position

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*This lesson addresses the concepts of: dividing the fingerboard to three left hand positions, the use of left hand pronation to achieve extended positions, and principles of weight transfer between fingers.*

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### **Key Concepts**

- Starker divided the fingerboard into three groups: the **four finger positions**, the **three finger positions**, and the **thumb positions**.
- There are two possible shapes for the **four-finger positions**: the square position (with half-steps between each finger), and the extended/rotated position (with whole steps between the first and second finger, and a half step between the other fingers). The whole step between the first and second finger is created by the rotation of the left arm.
- Just as right arm rotation brings the thumb to its place on the bow, left arm rotation involves movement of the thumb beneath the neck during extended position. This rotation allows the first and second fingers to be spaced out easily.
- Historically, cello technique has been based around stretching movements. The more one is able to rotate and see what can be done with the rest of the body to support this rotation, the less effort is required to maintain adequate spacing between the fingers.
- In the **three finger positions**, there are all possible half- and whole-step patterns. Many cellists lack sufficient clarity in this area on the cello, which often causes intonation issues.

- **Thumb positions** start when the first finger is playing the note above the harmonic at the midpoint of the string. An octave is created between the thumb and third finger on two neighboring strings. Again, in this area on the fingerboard, there are all possible finger patterns between half and whole steps.
- The only way to change a note on the piano is to lift a finger and drop it on a new key. On the cello, notes are changed either by dropping new fingers on new notes or lifting the fingers above the note to be played. Lifting and dropping at the same time creates confusion.

### **Exercises for Application**

- Play chromatics in first position on the D-string (E-F-F#-G). Use the arm weight to lean on each playing finger. Check that the arm is at a proper height to accomplish this. The arm weight shifts slightly as each new finger is put down.
- Stretch the left arm in front of the body and rotate it to the left and back. Very slowly bend the elbow and keep rotating from the upper arm until the hand reaches the fingerboard around first position. This rotation is the pronation of the left arm.
- During rotation, the first finger is leaning on its side, not in the middle of the finger. This allows the second finger to move further from the first finger without having to stretch or cause tension in the shoulder.

## Lesson 13: Molto Legato Bow Change

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*This lesson discusses the difference between pulling and pushing sensations in the right arm, and the function of those motions in executing smooth, anticipated bow changes.*

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### **Key Concepts**

- When connecting bow changes, a smooth, legato motion is necessary in order to avoid abrupt gestures. This concept is similar to that of the sitting-to-standing exercise in [Lesson 1](#).
- Effective smooth bow changes are dependent on distinguishing between the sensations of pulling and pushing. One needs to be aware which parts of the body are engaged while pulling an object, and which parts are engaged while pushing.
- The arm changes planes as the bow is drawn. If the arm does not change planes, one will “hit the wall” at the end of the bow and then have to rebound. Preparation of the change in bow direction involves changing planes towards the end of the stroke, generating a smooth, circular motion.
- It is a common tendency to initiate actions by the body parts which are very close to the point of contact with the instrument. When the motion is initiated further from the point of contact, there's a higher likelihood for smooth movements.



### **Exercises for Application**

- Find a stable object (such as a piano). Extend the right arm in front of you and pull on the piano. Notice what in you is being engaged in the pulling. Then, push with the back of the hand against the piano, and notice how different it feels to engage in pushing an object. It is highly recommended to refrain from intellectually analyzing; just focus on the different sensations of pulling and pushing.
- Pull the bow on the G-string and engage the same apparatus that was activated when you were pulling the piano. Make sure the feet have firm contact with the floor. Switch to pushing the bow on the D-string.
- Place the bow on the G-string and draw a down-bow (pulled bow). Gradually start engaging the pushing apparatus of the upper arm as you get closer to the tip, while simultaneously continuing to pull the bow with the forearm. This will naturally result in playing a double stop with the D-string. Reverse the process for the up (pushed) bow on the D-string. When getting closer to the frog, engage the pulling apparatus of the upper arm while the forearm is still pushing, resulting in a double stop with the G string. At this point, allow the wrist to respond freely to the forces coming from the arm instead of initiating a change of direction from the hand.
- When the above exercise becomes comfortable, play on the G-string only, but imagine that the double-stop transition and arrival on the upper string still happens; this visualization will help the arm feel when it is time to change planes.
- To aid in the execution of sostenuto changes, keep the weight on the first finger consistent.

## Lesson 14: Articulations

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*This lesson discusses the two families of articulations: anticipated/prepared and stopped/delayed; and conceptualizing articulations as different consonants followed by different vowels.*

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### **Key Concepts**

- **Articulations** are the instrumental equivalent of verbal pronunciations. Musical articulations resemble the accents of different languages. The shape and depth of notes within phrasings often bear similarities to the characteristics of their composer's native language.
- Starker divided articulations into two families: the **anticipated/prepared** articulations and the **stopped/delayed** articulations. Anticipated articulations are characterized as smooth connections, whereas stopped/delayed articulations are more abrupt gestures.
- When discussing articulations, it is easy to limit one's tools for description to a set of fancy names (usually in French). It is preferable to describe articulations in terms of different consonants and vowels. When thinking about articulation this way, there are greater possibilities for variety in conceptualizing the shape of beginnings, continuations, and endings of notes.

### **Exercises for Application**

- On the D-string, play detaché strokes (uninterrupted legato changes) in the middle of the bow, making sure that the connections between the notes are smooth and uninterrupted. It is important to notice any abrupt gestures during the bow changes. To create a staccato gesture, apply weight on the bow (bringing the stick closer to the hair) and release it quickly as the bow starts moving. Make sure that the weight transmitted through the fingers is on top of the stick and not on the side; this will give you a more defined (sharp) beginning to a note.
- It is helpful to think of spiccato as a stroke belonging to the anticipated/prepared family, and to focus on a horizontal, dipping/sinking action rather than a vertical action (where the attention is on the lifting of the hair from the string). The stroke is generated from a circular arm motion (like in detaché) that in turn causes the bow to lift from the string at the points where the arm becomes lighter.
- In order to allow the natural elasticity of the bow to guide the spiccato action, hold the bow at the screw, with the middle finger underneath and the thumb/first finger securing it. Try to play a few spiccato strokes using this alternative bow hold. If the hand starts moving actively and independently from the circular movement of the arm when returning to playing spiccato with a “normal” bow hold, return to the alternative bow hold to train the arm and hand in the more integrated motion. Focus on the sensation involved in making continuous and effortless spiccato strokes. Alternate between detaché and spiccato. Make sure the arm motion is the same for both strokes.
- The more these strokes are perceived as little grooves/loops, the better the result. Spiccato is off the string but the focus is not on lifting; it is about letting the bow bounce by allowing it to become lighter, and relying on the natural features of the bow.
- To work on consonant articulations, play a scale with a “B”--“bah” sound at the beginning of each note. Instigate the motion from the arm, with the hand reacting, to create this articulation. Follow with “K”--“kah”. It should sound different than the “B”. Choose more consonants such as: “T”--“tah”, “M”--“mah”, “N”--“nah”, L--“la”. To focus on the release (vowel), try to emulate “Boo”, “Bee”, and “Boh” sounds, attending to the vowels *after* the consonants.

## Lesson 15: Shifts

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*This lesson addresses the organic shifting apparatus and types of shifts used for expressive purposes.*

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### **Key Concepts**

- Shifts are a means of connecting positions. Positions are necessary for having an organized approach to the fingerboard. Usually, these connections are smooth and made by an arching motion in the arm.
- The arch can either be on top of the string or below the string. When occurring on top of the string, the arm feels heavy when anticipating the motion, lightens during the shift, and becomes heavier again when landing in the new position. When occurring below the string, the motion is similar to diving into water and coming up with the head to breathe.
- It is advisable to pay attention to the speed of a shift (same speed along the way, increased speed towards the target, slowing down towards the target, etc.). Different speeds create different musical outcomes.
- Another important distinction to make is whether a shift includes an **anticipated** connection or a **delayed** connection. In an anticipated connection, the shift occurs with the “old” finger (the one playing in the position of origin) and changes to a “new” finger upon arrival at the new position. This can be done within “old bow” and “new bow” combinations as well.
- An anticipated shift is often used to create clean connections between positions. Keeping the arm and hand very light during the shifting movement eliminates “shmears” or glissandos.
- Sometimes, the shift is used as an expressive tool and so one has to decide what kind of shift is desired to enhance the expression.

- When traveling from a lower position to a higher position, Starker advocated shifting with the same finger, or changing from a higher finger to a lower finger.
- Often, people are only focused on accuracy of pitch while shifting, and not on the quality of the gesture. As a result, the movement of the arm tends to be tight. It is important to treat the anticipatory gesture of the shift as the active part (where all the ingredients of the action: distance, style of shift, speed, etc. are implanted into the gesture) and the shift itself (the traveling) as an outcome of that gesture--the passive part.

### **Exercises for Application**

- On the D-string, shift from an F in first position to a B-flat in fourth position. Keep the bow moving. Make sure the feet are supporting the torso. Imagine making an arch with the elbow during the shift, feeling the energy generated from the back. Allow the forearm and hand to move as one unit.
- The shape of the arch and the amplitude change when one shifts a greater distance. The clarity of that shape needs to be part of the anticipatory gesture of that shift.
- The anticipatory gesture must be proportionate to the distance of the shift. It is similar to the long jump and high jump in athletics; the bouncing board is what propels the jumper into the air. Every arch needs a “bouncing board”. Every shifting action begins with a downwards action that propels the motion of the shift.
- Make the arch underneath (a scooping motion). This is seldom used, but valuable to practice anyway so one can always control what the arm is doing.
- The bouncing motion has to propel the arm forward and back along the fingerboard; it is important not to move the arm in a vertical direction (towards the ceiling).
- Another element to be aware of is whether the arm stays at the same speed, increases speed, or decreases speed during a shift. Shift from F to B-flat and maintain the same speed throughout. (Still make the arching motion.) Then, start slowly and speed up as the target is reached.
- To practice an anticipated shift, shift on the D-string with 1st finger E to harmonic D and play the F with the third finger when the new position is reached. To practice a delayed shift, do the opposite--apply the third finger as the movement begins.
- Next, attend to the bow. Shift with the first finger to the new position (harmonic D) while on the “old” bow. Change the bow and switch to third finger for the F. Then, practice either slowing down the arrival or speeding up the arrival. This is the anticipated shift; old bow-old finger, changing on the arrival at the new position.

- Change the bow and finger right from the beginning (new bow, new finger).
- To practice same finger and higher-to-lower finger shifts, shift on the D-string from 2nd finger E to 2nd finger on the high F. Then shift from 2nd finger on E to 1st finger on the high F.

## Lesson 16: Vibrato

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*This lesson discusses the mechanical gesture of vibrato and the awareness of natural string vibration as a resource for organically enhancing these vibrations.*

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### **Key Concepts**

- I believe that vibrato is the hardest thing to teach because it is very personal. Accomplished players have very distinct, unique vibratos--it is like their personal fingerprints. This said, there are common principles that must be present when working on vibrato.
- It is of utmost importance not to distort the natural vibrations of the string.
- If the amplitude of the vibrato goes above the note, it will sound out of tune. It is important to come from below the center of pitch, and “hit” the note.
- I believe that it is important not to impose a personal taste of vibrato on a student (it is a good idea for a teacher to express an opinion on the outcome of a student’s vibrato, but not to try and impose that opinion). The resources for the vibrato movement are the natural vibrations of the string. It is easier to feel these vibrations on the C-string (since it is the thickest), but one needs to develop sensitivity to it on all strings.
- In lower positions, it is common for the forearm to get very close to the upper arm. It can feel as though the two are being clamped together. To allow freedom of forearm movement, one needs to feel a space between the inside of the forearm and the inside of the upper arm.
- When working on continuous vibrato in the hand, the focus should be on the continuous horizontal movement in the arm, not the vertical action of the fingers.



### **Exercises for Application**

- Shift back and forth on the D-string between 2nd finger F and 2nd finger B-flat. As this becomes comfortable, start reducing the distance. Continue to do so until the arm is no longer shifting and the finger is centered in place, but the arm keeps moving as if it were still shifting. It is better not to rotate the arm/hand during the vibrato motion.
- Practicing vibrato with rhythms is a good strategy for gaining control over the motion.
- Loudly play the harmonic G on the C-string (around the neck of the cello). While playing, feel the vibrations of the string on the skin. Don't press, just feel. Feel the vibrations of the string on the harmonic, and then gradually allow the arm weight to sink into the playing finger so that the vibrations of the string are felt on a solid note. Sympathize with the vibrations and enhance what you feel. Slowly direct your awareness from the tip of the finger through the arm and onto the rest of the body.
- It is important that the arm continues to instigate the motion as the vibrating finger changes. In first position on the D-string, play chromatics--E-F-F#-G. Look at the arm and see that it continues to move.

## Lesson 17: Breathing and Body Rhythm

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*This lesson addresses ways for enhancing instrumental capability by linking it to breathing and the natural rhythms of the body.*

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### **Key Concepts**

- It is useful to examine the similarities between paced exhalation and bow distribution, and how breathing affects the bow movement in general.
- One should pay close attention to how one expresses oneself through singing. Even inexperienced singers can apply singing/breathing mechanisms to the instrument. The vocal cords can be perceived as the strings on the cello, and the breath as the bow.
- Specific characteristics of the mood and nature of a musical phrasing can be found within the character of the inhalation prior to playing that phrase.

### **Exercises for Application**

- While exhaling, practice making “puffs” (an “s” sound with an exclamation), dividing the exhalation into segments.
- Recall the grooves exercise from [Lesson 7: Bow Distribution](#). Make the “puffs” in sync with the bow grooves. As with the original exercise, start with two, then increase to three, six, eight, etc. Then, try the “puffs” without grooves (while continuing the bowing motion).
- March while sitting as you resume the “puffs” and “grooves”. When marching, never have both feet on the floor. The moment one foot touches the floor, the other one lifts.

## Lesson 18: What the String is Telling the Bow

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*This lesson provides sensory exercises for understanding the relationship between the bow and the string.*

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### **Key Concepts**

- Imagine that the bow and the strings are like human entities which influence each other through sensory cues. It's the responsibility of the player to identify the cues coming from the string and to respond to them rather than imposing force on the string.
- When the bow is applied on the string, the string provides a counter-force. If this is not observed, players will often impose their will on the string through the bow, without attending to the counter-force generated by the string.
- In order to understand the relationship between the bow and the strings on a sensory level, one has to listen to what the string is "telling" the bow.

### **Exercises for Application**

- In pairs, both partners hold hands, and one applies minimal force (a pushing sensation generated through the arm with a very soft handshake). The receiving partners prevent their elbows from being pushed backwards by providing a counter-force in a proportionate amount to the force coming from the initiating partners. This is the same interaction that happens when the bow is applied on the string, a type of sensory conversation.

**“SCHELOMO”**

Composed by Ernest Bloch

Performed by Uri Vardi with Yale Philharmonia

Conducted by Otto Werner Mueller

Recorded live on February 3, 1978.

**“KOL NIDREI”**

Composed by Max Bruch, Arranged by Gunter Ribke

Performed by Uri Vardi with the NSCI Cello Choir

Conducted by German Marcano

Recorded live on August 17, 2012.

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