

The Mental and Physical Preparations for Performance:

## A Cellist's Reflections

Master Thesis- MUV351: Musical reflections

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## Introduction

Since I began my master degree, I have become more acquainted with the demands of the professional musicians' work and routines. I observed that there are two main ingredients that in my opinion every performer should strive for—the ability to present his work with certain quality, and to have the ability to maintain this quality in time. I was able to notice that musical professionalism is achieved through a consistent approach in daily practice.

We as instrumental players usually use serious amounts of time forming our ideas about the given piece that we are going to perform, and also interpreting the composer's intentions. This process needs to be coordinated with the ability to determine and secure that our intentions will be executed in reality through the instrument that we are playing. This second process is usually done in the practice rooms where the musician, through experimenting with a variety of actions, finds the most suitable one that corresponds to his intellectual and emotional ideas and masters them. The summarization of the successful motions that correspond to the aesthetical demands of music can be called "technique of instrumental playing."

I as a cellist decided to investigate the mechanics of my instrument and clarify what kind of actions will be suitable for its demands. The complexity of the human movement is not easy to be described or analyzed, especially when concerning difficult patterns that we execute while playing a musical piece. In my opinion, we need to simplify most of the matters in order to achieve some practical benefit. I do not think that it is necessary for a professional musician to have a scientific understanding for all the motions and the mechanics of the body and the instrument. The intellectual energy should be directed in finding some sort of a psychologically comforting and intuitive knowledge. I also believe that structuralizing this intuitive knowledge can provide a lifelong basis for a successful activity. This sort of organizing is of course very individual, and depends primarily on the personality of the player. It is logical that if some person does not encounter problems with achieving good intonation or quality sound, he will not need to burden himself with analyzing and fixing problems that do not exist for him. On the other hand, a player who does encounter difficulties as mentioned above is inevitably forced to find the solutions through experimenting. In this way, they become aware of what is preventing the desired results

from actually happening. In my personal experience, I have encountered most of the time a mixture of the two extreme cases. Most people meet, at a certain stage of instrumental playing, some problems that disturb the process of delivering the musical message. This can happen even on a very high skill level. That is why the practicing process is necessary for each musician, and the goal should be to make it as effective as possible. This goal includes the question of how we as instrumentalists can take advantage of the given time that we have to prepare a certain piece. Here I believe that the conscious understanding of the mechanics can accelerate and secure the use of practicing time.

I have often observed that even on a very high level of musicianship, the musical message can be distorted by lack of proper instrumental control. Nervousness and stress are factors that we have to consider, and to try to find a way to counteract. A very simple example is the so called “shaking bow”. This happens when serious amount of nervousness is encountered and the performer loses control over the bow. It starts to shake and not maintain its sustained contact with the string. Other examples can be if someone is not able to focus the intonation, or the hand slips off the fingerboard especially when playing in thumb positions. Restricted breathing and tightness occurs inevitably. Those and many other problems can happen and thus disturb our intentions. In my own experience, I found that there is nothing more disappointing than the inability to counteract the nervousness and to lose the instrumental control and security when you most need it. Therefore, I decided to investigate what are the causes for such a distortion in stage performance and how we can prevent it. I believe that the preparation should start in the practicing process.

There have been a number of other people that have used time investigating this same issue. These include the famous cellists and pedagogues: Janos Starker, William Pleeth and Gerhard Mantel, and the violin teachers: Carl Flesch and Ivan Galamian. In their writings, they all rationalize and systemize the guiding aspects of string playing through language and expressive means that differ considerably between each other. For example, Pleeth’s book “Cello” I find very intuitive, while Mantel’s book “Cello technique-Principles and forms of movement” explores primarily a scientifically correct approach to cello playing. Especially interesting for me was Janos Starker’s article – “An organized method of string playing,” which creates the impression that it is a mixture between the analytical and intuitive

approach. After reading this article I started to experiment and borrow some of his ideas and incorporate them in my own playing.

Throughout my studies, many different teachers and players for which I have great admiration and respect, have shared with me the opinion that each individual player needs to find his or hers own way of playing. Although I agree with this, I also think that even with the vast variety of individuals that differ in size, length and weight, there are basic and general principles that they can all incorporate. The individual aspect shows itself in how students or already professional players incorporate those principles in their work. I agree that the way to adopt those constructive rules and ideas is strictly individualistic and depends on the person's own experimentation during the practicing process. In a more practical sense, each performer must develop a personal system of exercises that will improve the noticed shortcomings.

The value of finding and clarifying those general rules for cello playing is found in satisfying our need for consistent and progressive work. While reading the other writings, I observed that most of the time there was nothing new said or invented. Rather, ideas were organized into constructive principles that guided activity. The general rules for cello playing were acknowledged and applied to that which is lacking. In other words, the point was to make us aware of mechanics of playing. How much we need this awareness, I am not yet able to answer. Some players play the instrument beautifully, exploring its full capacity and delivering the musical ideas unhindered, without any knowledge of the mechanics of the instrument. We may call this talent or intuition—when someone seems to understand and follow subconsciously the demands of the instrument and the music. On the other hand, it is not certain that people can rely on their talent being consistent. This can be shown only through time. I am sure that spending time thinking over the basic principles of the instrument can be harmful to some people. The time spent on over-analyzing can disturb their subconscious actions. However, there is also the risk that one day they can lose their abilities and will then need to revise their work.

Adjustments in playing are usually accomplished through a conscious understanding of the problem. This is more the professional side of the instrumental playing. Once the conscious training of actions cease, the motions will hopefully be applied automatically. A performer

simply does not have time to think over what is happening during a stage performance. The players who have solved problems through conscious exploration have an advantage in that that they can teach others their knowledge. Through the transmission of this knowledge the students receive reasonable information that they can use for their life-time.

I decided to organize my research into two categories. The first one investigates the general guiding principles of movement in both the mental and physical sides of playing. The second part will focus on specific, technical problems concerning the bow arm and the left hand fingerings. (This method of separating the problems involving the left hand and bow actions is just a transitory stage in the real practice since the arms and hands are in constant synchronization during the playing activity). This synchronization is controlled by the personality of the player so this is why I believe that it is most appropriate to start first with the relationship between mind and body.

## **Part 1:**

### **General principles of movement – The relationship between the mind and body**

#### Mental aspect

In my opinion, there is very serious mental preparation needed for performance. We should not forget that the brain and the nervous system control and execute all body movements that we produce. Gerhard Mantel describes this process well in his book *Cello Technique*<sup>1</sup>. He explains this relationship by looking at the physical aspect of playing as a consequence of the mental. There are, of course, some exceptions due to physical limitations. For example, not every player is capable of doing all kinds of extension fingerings. Or, some people have shorter arms and thus creating difficulties with maintaining a proper angle with the bow. Then must do certain adjustments with the position of the instrument or themselves, and this problem can be solved. In general, all standard sized individuals can obtain a good bow hold and all the three kinds of the left hand position and maintain it on the four strings. We need to remember that experimenting is always helpful and we can always try to advance our basic seating position, or apply a variety of body positions for specific playing situations.

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<sup>1</sup> G. Mantel, *Cello technique principle and forms of movement*, Indiana University Press, Bloomington, 1995, p. 3

In Starker's article he discusses the importance of the anticipation aspect in all phases of instrumental playing. According to him<sup>2</sup>, anticipation is the most important facet of music making, and is a part of music itself. In the context here, the beginning stage of each movement can be described as beginning in the brain. In other words, there is a conscious control of movement. Of course, performers cannot in the moment of a performance consciously think about all the movements they must execute. They simply do not have time for this. However, I found that trying to consciously executing my movements it is a very useful tool in the practicing process. Indeed, mental understanding of a movement is the basis of all action when playing an instrument. In my own reflection about this concept, I believe that the Starker did not mean something that is a novelty for players. Anticipation is constant both in playing and throughout daily life. Anticipate is done mostly unconsciously, and it requires strong observation skills to discover the mechanisms. The observing of anticipation can be logically applied to the practicing process. Let's say that a note that I have played was not the desired one. Instead of correcting that single note, it can be more reasonable to go back to the place that leads to that note. The problem occurs before the wrong note—in the preparation for the upcoming action. Anticipation of action is primarily dependent on the rhythmical context. It is important to remember that an understanding that the rhythmical aspect of music is one of the greatest allies in instrumental playing. Neglecting its importance and significance is, in my opinion, the greatest reason for the so-called cramped or tensed playing.

Another interpretation of the same or similar mental process is presented by Gerhard Mantel<sup>3</sup>. He calls it a "goal-directed movement" in the topic of a position or string change. The position of the arm has to be adjusted in both cases. If a player knows where he or she is going to arrive, the muscles will then automatically execute the motion unless there are factors that hinder our activity. These hindrances can be psychological, physical, or both. A musician's job should consist of finding and counteracting those hindrances to a goal-directed movement.

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<sup>2</sup> J. Starker, *The world according to Janos Starker*, Indiana University Press, Bloomington, 2004, p. 276.

<sup>3</sup> Mantel, p. 25.

The mental aspect of playing is in my opinion is the most important aspect in that it is responsible for the outcome. It is also the hardest to correct if there are disturbances. Such disturbances are stress and anxiety surrounding a performance. One must remember that performance anxiety is not something completely negative since without it, a player can appear indifferent towards the value of the musical experience. One needs only to find a way to use the stress constructively in performance.

The mental aspect is also very closely connected to musical interpretation. I believe one will not achieve clear and focused actions on the instrument without the proper musical motivations. Before attempting to learn any given piece, one must spend time clarifying the musical understanding (interpretation), and turning their idea into reality. Without such an interpretation, it is less likely to achieve well-balanced actions because of the lack of necessary mental impulses that begin the chain of physical gestures. In reality, there is not a clear separation between the musical or technical side of playing. They are interrelated and cannot be logically separated.

There is one aspect that I am not yet able to find a clear answer for yet, and future investigation will continue. This is the issue of how much of the playing should be subconscious activity and how much is conscious. In general, I think that it is very useful to become aware of the actions carried out during the practicing process. When performing on stage, on the other hand, a player should strive for a unified sensation or playing experience. In my belief, the last and final stage for the performer's development happen when they are able to deliver the musical message unhindered and body motions and functions are guided undisrupted by the idea for the musical line. In the end, the anticipatory motions that help achieve the necessary pitch and sound, should more or less function automatically.

### Physical aspect

In the physical aspect of cello playing is included the body movements and muscle use while playing. In my practicing process I have not yet found any practical benefit from a certain knowledge that is extremely accurate about which muscle groups are responsible for the different actions that we perform (for example which muscles act when we pull the bow or stop the strings down with the left hand). This knowledge may be constructive only if it can have a psychological effect on us in a positive way through experiencing their action. In my own experimentation and research, I discovered that there are so many muscles included in the process of playing that we simply cannot observe them all. I see this in comparison to how the human eye sees the vibration of the string. The human eye does not see separated vibrations but a whole act. In my opinion, one can use the same approach in regards to muscle use. The player can only sense or feel the muscle use during playing as a whole, not as separate acts. Muscle use can feel balanced and effortless or the tight and strained. From many people have I heard cello playing being compared to the swimming and I myself have found that there are many similarities between both activities. One can sense that the power of the arms comes from the back and the trunk and in both swimming and cello playing; the whole body is equally involved in its goal. The player does not need to know which exact muscles are responsible for the activity; the body functions are accorded to the relation of our motives and goals.

The mastery of the cello as an instrument depends on how successfully one uses his arms, hands and fingers. There are two main ideas that have had a big impact on me in regard to the nature of limbs. One of them belongs to the violin teacher Ivan Galamian, which he presents it in his book *Principles of violin playing and teaching*.<sup>4</sup> According to his belief all our joints work most efficiently in their natural form of spring-like quality. I have found that the elastic element of the body and how well we can use this is of enormous importance. There should be a constant flow of tension and release in the body and limbs and one should not forget to release the tension whenever it is not needed. Through the release of tension the player prepares for the next action. If the individual have not released the tension from before, then he will not be ready to do the following action as efficiently since his muscles are not prepared for it. In regards to the left hand, one needs to stop the string at the

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<sup>4</sup> I. Galamian, *Principles of violin playing and teaching*, Prentice-hall inc., Englewood cliffs New Jersey, 1985, p. 44.



desired distance and then be sure that when he gets to the next finger to release the previous one. I have found how much this release of tension helps us as instrumentalists in our attempt to conquer the fingerboard. Another example is the following: a cellist needs to exert considerable amount of power at the tip of the bow in order to sustain the sound, but he have to make sure when he goes back to the frog to release that tension and substitute it with arm weight (which is more than enough even for the strongest sounds). Not releasing the tension causes pointless waste of energy. So in other words the player should not lock the joints but keep them ready to move and flexible as much as possible. This spring-like and elastic element allows him to use inertia and momentum in his actions which makes it much more comfortable and also corresponds to the demands of the instrument. Knowing how and when to tense and release will put the performer into a state of ability to move at the necessary time with the desired quality.

This, in my opinion should be our constant goal. The instrument itself is built on the basis of springs. The strings, the bow hair, and stick, are all elastic. The spring element in our body also prevents us from very disruptive motions that cause jolts and disruptions in the muscle system.

The other important idea that I have encountered and I found extremely useful is the observation made by Starker in his article about the circular function of all limbs of the human body. He points out that excessive tension is caused by so-called angles which occur in the joints. He suggests that one have to substitute that with sensations of curves<sup>5</sup>. In my experimenting process, I found that avoiding all kinds of disruptive motions and substituting them with curved and circular motions which keep the flow of movement undisturbed is vitally important. The rotation of the forearm while bowing and shifting, the pronation and supination while changing bow directions and reaching the tip and frog of the bow are just a few examples in which the flow of movement is necessary. Similar mechanism happens in the left hand. The hands as well move in circles especially while playing spiccato, vibrato, or executing bow changes. The player should also pay attention that there is a certain circularity in the standard bow stroke – the elbow does not follow the same path on the down and up bow but instead draws counter-clockwise or clockwise circles on each cycle.

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<sup>5</sup> Starker, p. 274.

This circular elbow motion is encountered also in position changes and string changes (clockwise or anti-clockwise depending on the goal). This is of course a psychological way of seeing those actions. In reality they might be more elliptical or curve-like, but the main idea is to find the sensation of roundness.

There is also a third idea that I find worthy to mention. Especially in fast playing one should try to use the power of inertia as much as possible instead of counteract it. The performer should use momentum in all actions; this saves lot of energy than not releasing the movement and carrying it all the way with the musculature. This I find very useful especially in all playing actions.

It is understandable that none of those principles can be fully incorporated without finding first a proper seating position with which the player is able to feel and maintain balance and flexibility of the body. One must find a way to sit that allows him easy access to all strings and positions, which deserves quite serious amount of individual experimentation. There are several things that the individual can experiment with— which part of the chair to sit down, the height of the chair, length of the endpin, placement of the feet and angle of the instrument. Some of them can vary and be changed within the course of a piece, for example— placement of the feet and angle of the instrument. It is important as well to have the ability to include the rotational motions of the hips and the torso in certain movements. This contributes to the cellist's power when bowing and shifting left hand positions. In general the player can try many different actions that can support his arm functions. For example, one can lean with the upper body with the bow direction or opposite to it, leaning with the trunk when reaching the tip to the left, pressing with knees and so on.

Breathing is another important element in instrumental playing. It is advisable to pay attention to how we breathe because if breathing is restricted during the playing, then cramping will be encountered very soon. The human body functions poorly when this important element is hindered. The instrumental player can approach breathing with certain exercises, but in the end it will be a subconscious act related to how he forms phrases and musical units. Irregular breathing can badly influence the trunk and shoulders and thus disturbing the precise actions of the hands, arms and fingers. Such irregularity is often encountered when difficult passages are next to come.

## **Part 2: Technical problems concerning the bow arm and left hand and fingers**

### The right side – bow arm

When we as cellists discuss the bow arm we are discussing the basics of the sound production on a string instrument. In this topic are included how the right arm, hand, and fingers establish contact with the bow to provide the necessary movement and power in order to set the string into the desirable state of vibration. It is known that the string vibrates ultimately if the bow motion remains in perpendicular angle to the string. One needs to establish this angle, and form the bow sustaining according to it. If not, scratches can result in the sound production process.

Other important factors that influence the sound are pressure applied on the string (some people prefer calling it “weight” for pedagogical purposes), contact point or sound point (the place that one place the bow in relation to the bridge), and speed of bow. Those three factors completely depend on each other. In my belief, the individual needs to know the basic relationship between those three factors. Through experimentation, the player can notice that a slow bow with a firm contact acts very well on a contact point close to the bridge. This is not always true because if one stops the string with the left hand on some note in the high register, he will need to decrease the pressure or increase the bow speed. Through the finger pressure of the left hand the string is made shorter. A light bow with relatively more speed is acting better on a contact point far away from the bridge and closer to the fingerboard. What I have noticed, and until now experienced, is that the variations of these three factors are so many and almost impossible to systemize them. This is in a big degree, the art of the sound production. Any mathematical approach that goes further in its attempt to create a general picture of influence between the three factors is not of any practical importance. One can hear so many great players with such a variety of handling the bow. This is in large degree the beauty of playing the instrument. After the basic principles of how to guide the bow are utilized by the player, there can be only musical motivations left to decide how to lead it in its usage. We can generalize that the louder we need to play, closer to the bridge we need to place the bow. When we play closer to the bridge, we will eventually get the richness of the overtones and the sound will appear more brilliant and

moving forward. One also has to acknowledge that the four strings need to be handled differently. The C string is much thicker, needing slower time to be set into vibration in comparison with the A string. An over-generalized approach or answer is that the player needs to be sensitive to the different qualities and characteristics of the different strings, and regulate the weight, contact point, and speed according to them.

Not coincidentally the bow has been compared to the breath for wind players. In my opinion, this is the main tool for shaping the musical message. The comparison between the breath and the movement of the right arm while bowing I encountered first in Janos Starker's article<sup>6</sup> where he claims that controlled breathing is responsible for the even bow speed and preparation of phrases and musical units. This is also why I believe that the mechanical approach is not appropriate except in cases where we encounter difficult bowing patterns. Even then, after the conscious practicing process the mechanical approach evolves in gestures serving the musical message. Such complex bowing patterns a cellist can encounter for example in the Caprices of Piatti, Duport, Popper, and Grutzmacher's etudes, and certain pieces from the repertoire. Those examples usually involve extremely fast string crossing or certain strokes that are not so often met in the literature. In such cases, I strongly believe that the conscious understanding of the mechanical aspect of the arm motion can serve the performer well (understanding and following what is the shape of the required circular arm motion).

I have encountered many different ways of explaining the basic bow-arm system from the variety of writers. For example, Gerhard Mantel explores a very accurate and scientifically correct approach, while other pedagogues like Starker, William Pleeth, Ivan Galamian, and Carl Flesch use more of a psychological and intuitive way of describing the basic bow arm motion. It seems that this issue can be seen through many different points of view. It is then reasonable to think that each individual should find their own personal approach towards the sound production process. But even when we are speaking about individual sensations, I believe that there can be some things that all players can observe in their handle of the bow.

If we as cello players start first with basic legato, stroke from which we establish almost all the other strokes, we can observe several things. At the frog, the partial arm weight defines

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<sup>6</sup> Starker, p. 140.

the contact with the string. Through a pulling motion, the string is set into a state of vibration. If one mentally split the bow in two equal parts the first part is executed mostly with the upper arm, and the second part with opening the forearm. It is important to notice that in the second part, the upper arm should remain moving as well. One needs to keep the upper arm moving at all times. The player can also observe that while at the frog he can rely on arm weight when he travels towards the tip the arm weight decreases and is substituted with the inward rotation of the arm which transfers the arm mass into the string and sustains the contact between the bow and string. The index finger also increases the contact with the stick because of the pronation mechanism of the forearm while reaching the point of the bow. This whole process one can experience on a down bow. While playing an up bow, it is necessary to substitute gradually the rotational forearm function with partial arm weight when reaching the frog. The contact of the thumb also gets firmer when reaching the tip, and then releases when coming back to the frog. The small finger can counterbalance the weight of the tip while the bow is near the frog, and it changes its role at the tip into pulling the frog upwards and participating in the pronation mechanism. The forearm rotates through the entire bowing action into the direction of the pronation or supination. I do not think this is a precise description of the basic legato stroke since there are no scientifically accurate writings on the matter. There are many muscle groups that participate in the process of forming a legato sound: the biceps, triceps, finger and forearm muscles, and the muscles of the back, and shoulder. I do not believe that an accurate description of their participation can serve us as cellists well. My attempt is mostly focused on what the player can feel while executing the basic legato stroke. I have observed that one does not need to make up and down-bow movement the reverse motion of each other, but the player can allow at each cycle to execute with the elbow a counter-clockwise ellipse (horizontal figure eight is also often used for describing the arm movement). This gives a better preparation for the up bow, and it can result in making the start of the up bow as powerful as the down bow. The forearm is also more pronated on up bow than down bow. This is part of the secret to being a good string player- have the ability to play pianissimo at the frog as well at the tip, fortissimo at the tip as well at the frog, and to make no difference in the up and down bow.

Bow changes are another subject that deserves to be discussed. It is difficult to systemize how many kinds of bow changes are possible to be done. If we discuss this, we also need to

discuss how many ways of initiation and attacking the sound exist. It is obvious that the bow change need to be accorded to the desired articulation one strives for. For example, it can take the form of a different consonant, or it can be sounding like a vowel. It can have more of a percussive character, or more curved. From a technical standpoint of the bow changes can be discussed in the most general sense when the player encounters it in the legato stroke. The goal is to maintain the continuity of the sound through the last moment of the previous bow and to set the string into the same vibration on the new bow direction. The difficulty occurs in that - the player needs to change the direction of the arm very fast thus disturbing the natural pendulum movement. The way that this abrupt motion can be counteracted is to allow the hand and the fingers to remain going in the old bow direction for a very short amount of time after the arm has already changed into the new direction in a more smooth way. The technique is described by many pedagogues, such as Starker<sup>7</sup>, Mantel<sup>8</sup>, and Leonard Rose<sup>9</sup> (the last one calling it “the paintbrush technique”).

String changes are another important issue that we need to clarify. In moderate tempos, one can follow the principle mentioned above concerning the bow direction change – that the larger part of our arm prepares the new position. We can take the elbow as the leading point and the wrist or the hand as following the elbow. The elbow is in reality, the arm. However in very fast tempos, this way of preparing the new level does not seem to be so efficient. Following this principles the player can experience an enormous jolt, causing the musculature of the body to tighten. It should be possible for the player to find another way of executing such fast motions without so much effort. The way that I have found successful is the so called principle of the “double lever”. This refers to when two relatively equal on weight and mass parts of the body move in different directions at the same time. In this case the forearm and the upper arm to move up and down at the same time, causing the body to maintain its balance and not lose control. This technique is an example of needing to understand and use the mechanical advantage in executing certain strokes that we usually

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<sup>7</sup> Starker, p. 144.

<sup>8</sup> Internet cello society, *Conversation with Gerhard Mantel by Tim Janof*, 1995, retrieved 30 September 2013, <http://www.cello.org/Newsletter/Articles/mantel.htm>.

<sup>9</sup> ‘A lesson with Leonard Rose: 1978,’ (online video), 2013, <http://www.youtube.com/watch?v=ZZCZwvcSjJM>, (accessed 30 September 2013).

do not encounter so often in repertoire. I believe that the understanding of the mechanics will advance our solution of a specific problem that appears. Another point worthy of observing in discussing string changes is that one needs to keep the whole body as flexible as possible because he might need to rotate it in order to achieve a more comfortable position that will support the arm level. For example, A and C strings might be appearing at times not as comfortable as the middle strings because the player does not allow this sort of rotation. The rotation is done by the hips, but the legs also participate. Rotating the instrument is a solution to the discomfort found on A and C strings. The cellist can rotate the body to the right and the instrument to the left while playing on the A string, or the doing opposite when manipulating the C string.

I do not think there is much point for me to discuss the way to hold the bow. This issue has been described many times by different pedagogues and teachers. It is important is notice that one needs to have the hand and the fingers flexible and firm at the same time. Since one extremity is in contact with the instrument, it is logical that this part of our body will provide the necessary information about the desired quality of the contact with the instrument. This issue concerns both hands. If the player fixes the fingers into a rigid position this stream of information about the contact with the instrument or the “sensation of sound” will stop. Problematical places in both hands are the thumbs. Being aware of their elastic and curved character can provide solutions to a rigid position.

### Left hand

The left hand is the one responsible for controlling the pitch, so it is logical for us as cellists to assume that extreme accurateness is required. The most basic problem is intonation. There are simply no indications to guide the placement of our fingers over the fingerboard. Thus in the practicing process, the player needs to substitute the physical markings with mental ones. But before discussing the geography of the fingerboard I would like to focus on the basic requirements of the left hand. The fingers need to be able to stop the string at the desired place, which means that each finger needs to transmit power which is supported by

the arm and the back. In order to not lose this support one needs to make sure that there is no uneven tension in the fingers or the hand. In general, this means that the fingers and the hand have to be kept at their natural curved position as much as possible. Flexibility needs to advance. It is not possible to achieve this while playing the so called extended positions but the point is to relax immediately the undesired tension after arriving into a regular position. One also needs to make sure that he releases the tension from the previous finger that has played when he changes from finger to finger. In other words, there is a constant flow of tension and release in the left arm, hand and fingers. Another aspect of the approach toward the left hand is focused on the thumb. The thumb is always acting together with some of the other fingers, so the individual is never playing only with one finger but at least two. Therefore it is important for the cellists to pay attention to how the thumb relates with the other fingers and prevents it from unnecessary tensing. Too much tension in the thumb is actually something that the cello players need to be aware of in both hands. It is equally important for precision of intonation and quality of sound. Squeezing of the neck with the left thumb, or gripping of the bow with the right thumb is dangerous because they disturb our sensation of the contact with the instrument.

The problem of intonation on the cello is one of the most serious problems that string players can experience. There are different ways of approaching it. The one that I have found most useful is the so called idea of geography of the fingerboard. This is a mathematical formula of organizing the different positions into three kinds; 1- the first eight counted from a half step (which are also called four finger positions), 2- the neck positions ( the thumb positioned on the neck ) or three finger positions which are four and the thumb positions that are twelve. Usually it is considered that the thumb positions represent the biggest challenge for cellists and they are introduced to the student last. That can be more of a psychological issue than actually technical since the famous pedagogue and editor of the Ivan Galamian scale system for cello, Hans Jørgen Jensen, claimed that he had taught as an experiment first the thumb positions to a group of beginner cello students and that they did not had any problems. Rather, they experienced difficulties in the lower positions<sup>10</sup>. Separation and studies of positions have one considerable advantage - it adds an

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<sup>10</sup> Internet Cello Society, *Conversation with Hans Jørgen Jensen* by Tim Janof, 1995, retrieved 30 September 2013, <http://www.cello.org/Newsletter/Articles/jensen/jensen.htm>.



understanding for the mathematics of the instrument and something that we can call space awareness. The physical space between the intervals diminishes in the high positions. I am very far away from saying that this is the best way in order for us to perfect intonation since I have personally met people who do not have such an organized approach towards the placement of the notes on the instrument and they seem to do well. I suppose that in order to obtain a precise control over our actions on the fingerboard one can use more than one sense. Some people may rely more on their acoustic control while others on their visual sense. Even that this is hard to explain, because the fingerboard does not have marks and they can be added mentally through the imagination. Still others may use physical memory or the three together. I suppose that the issue mentioned here cannot be answered precisely since people differ so much from each other. Most likely, the answer will be the last one – using as many senses as possible.

When we mention the word position, this is mostly of a psychological importance. There is not really a position in the sense that the hand and fingers need to be fixed in a very accurate posture. The player needs to constantly adjust this posture in order to support the different fingers since they differ in length. The concept of position has its application in the goal of where to put the first playing finger which is the one that defines it.

Another important issue that can help cellists sustain intonation accurateness is the fact that they should be able to apply as less possible contact point on the higher strings and more on the lower since they are thicker. That on the other hand means that extreme precision is necessary especially playing on the A and D strings. One way to advance that is to try to sustain the angle of which we approach the strings with the first finger through the entire length of the fingerboard. This gives all positions the same angle. Of course in the end they can vary, but I think that we should apply those variations consciously because the different angles mean different intonation systems. In my own experimentation I have observed that the placement of the first finger is of fundamental importance since this is the one that defines the position. In thumb position the first finger's angle should be accorded to the middle joint which corresponds to the angle of the outer joint on the second finger, and the tip of the third one. The different angles promote easiness on certain extensions. For example, if our hand is in a relatively more pronated position, it can serve better the extensions of the first and second fingers. It can provide the player with position that he can

use through the entire length of the fingerboard, making intonation easier. Having the hand in a more supinated position, helps with the extensions of the small and third fingers. The third choice is to have the hand perpendicular to the fingerboard, providing maximum finger surface as contact point and it is generally considered to be more old-fashioned in that it has been proven to be less accurate through experimentation.

How much flesh one decides to use as a contact point is in a large degree decided by the individual ideal of sound. If the primary goal is intonation, precision, and purity of sound, then it is more logical for the player to choose as less contact point as possible. Then he can also strive to get the overtones from the instrument. On the other hand, if richness and powerfulness of sound is the primary goal, then more contact will serve the player better and have direct influence on the vibrato. Different schools tend to explore those issues with big variety. One can also aim the finger almost following the length of string in order to get maximum finger contact, but this is a very extreme way of positioning the hand, and it can be used only on occasion.

An interesting observation is that the human fingertips are wider than the actual accurate placement of the pitch. Aiming for less contact has more a psychological effect as it can clarify the placement of the notes considerably.

These are only general remarks that do not try to classify completely the variety of possibilities concerning the approach towards the fingerboard. Only in our experimentation can we observe the overwhelming richness of choices that we have. I also do not wish to over generalize the principles that lead the left hand, since each individuals hand is different. What I have written above is aimed at the average sized and proportioned hand. Of course, there are people built differently, and everyone should invent their own formula and make the necessary adjustment for their own needs. Some people have richer choice for extensions since their fingers are longer or others have fingers that are uneven.

Another interesting facet of fingering is the changing from finger to finger. There are two main finger changes. One is the legato transition. This involves transferring to the next finger very gradually. For a short amount of time, the two fingers are contacting the string at the same time, thus creating the legato effect. The other kind of finger change is when we hammer down the fingers by lift them high and then allowing the gravity and inertia to assist

the movement. This is used mostly in movement to upward intervals. In a descending run, left hand pizzicato can be used by plucking the strings sidewise. Left hand pizzicato can help to activate also an open string and thus helping decisively the bow action. Those two fingering techniques advance considerably the quality articulation. The use of both methods is used accordingly to the individual's musical goals.

To support the finger action, one can also use certain forearm rotations in the process of transition between fingers. This forearm rotation is part of vibrato itself, and is used when connecting from position to position. It makes the finger action more solid, and allows more freedom and flexibility in the knuckles which is crucial for the left hand technique. I first discovered this idea in the method book of Steven Doane, *Cello ergonomics*,<sup>11</sup> and it is also demonstrated by him in an instructional video, "Cello Technique – Finger Flexibility and Rotation."<sup>12</sup> I believe that this sort of forearm rolling can contribute enormously to process of solving the problems on the fingerboard.

Using at times larger motions can have an economic effect when they are well focused, rather than being an unnecessary expenditure of energy. This applies to the bow as well. The bigger motions promote the participation of larger muscle groups, making our actions easier. For example, a big lateral movement of the body can supply extra power in certain bow strokes. One should not forget that effortless action is usually much easier to be focused and controlled. A similar principle is applied in the most fundamental problem of string playing: the transition between positions. The action of the arm during position changes has the same leading principles as that of the arm action during bowing. The player can use a certain circular elbow motion to prepare the shifts which is similar to the motion in bow changes and string changes. This motion (lowering the elbow makes the preparation automatic), will free up the shoulder and arm. In harmony the movement starts with the upper arm and finishes with forearm rotation and opening. Another element that can be added is the participation of the torso. A rotational movement of the hips in the direction of the next position will additionally stabilize the jump in that it includes the whole body in the action.

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<sup>11</sup> S. Doane, *Cello Ergonomics A handbook to help develop freedom of movement, balance and fluency at the cello*, Bartholomew Music Publications, London, 2006, p. 6

<sup>12</sup> Cello Technique – Finger flexibility and rotation (online video), 2012, <http://www.youtube.com/watch?v=qnDFCiZh1dw>, (accessed 19 November 2013)

This rotation can be very well coordinated with the bow movement in that the player does not experience any mutual disturbance between the two hands. The legs can participate as well.

Here we arrive at the idea of the coordination between the two sides which in my belief is the last stage of instrumental playing mastership. The two hands are constantly interacting with each other and each one of them can either help or disturb the other one - the hand and finger movement is our primary goal, but this does not necessarily mean that one have to limit the motions of the body in order to spare energy. On the contrary – the player have to allow more activity and movement in order to support the actions of the fingers and hands.

As mentioned before, the circular motion of the arm while position changing is similar to the one applied when bowing. However, there is one big difference – in position changing, string players and cellists in particular need a more focused and determined concept for the upcoming action. In the bowing motion however, one still have time for adjustments and corrections during the bow direction. In position changing the player does not have time for adjustments unless he arrives on a note that is not the desired one and he then corrects it. The problem in this consists of the fact that the audience will hear this correction as well. Therefore in the practicing process we still need to avoid this kind of correction, and strive to get the whole movement at once.

In order to achieve clear motion while connecting positions the player needs to observe several factors. Most important for all is that the player needs to know what the desirable pitch is, and then accord his movement to it. This movement has to be prepared, and usually this preparation needs to be in a rhythmical context. Visual knowledge for the upcoming position will add additional security since it is connected to the performer's general understanding of the fingerboard. The arm has to be used in order to sense the distance. The pressure in the hand also needs to be reduced, since firm finger pressure is desired only in order to sustain a note. If the player does not allow that, it will hinder the whole movement. We can make again reference to the tension-release idea.

It has been interesting for me to observe the following situation: very often an experienced performer needs to start a phrase on a certain note in the high register after a break, then

usually the player uses time to pluck very slightly the note in order to insure that this is the right pitch. This fact brings me on the conclusion that cellists receive their space awareness for the fingerboard very much through movement. In other words maybe one is not capable to remember all the possible positions but more or less the relationships between them.

We should use certain time to discuss the so-called thumb position since it is a primary problem for cellists. In the thumb position, the thumb takes the role of the first finger in being the first playing finger that also defines the position. One of the difficulties encountered in this register is the fact that the placement of the thumb reduces considerably the overtones on the cello. One way to counteract the lack of overtones is to lift the thumb. However most of the security in the high register is lost then. Another technique is to place it on the side of the fingerboard and try to create a similar sensation to the one in the lower positions. The difficulty in this method is due to the construction of the instrument which will not allow the player to make a smooth transition between the lower and high positions. Therefore, the most logical thing for each player to do is to practice the three methods (thumb positioned on the strings, in the air and on the side) and learn to use them when is necessary.

Difficulties encountered in the thumb positions can occur because the thumb is not the ultimate finger for pressing down the strings. The contact point is too small. To be vibrated is also relatively hard, and requires for special exercising in order this aspect to be improved. Receiving support from another finger can make it relatively easier. Double stops help considerably the intonation in the higher positions especially using the thumb (thirds, octaves, sixths), because through the thumb's flexibility and freedom of movement (much more than the other four fingers), it does not have as much sense for space positioning in relationship with the other fingers.

The other difficulties encountered in the thumb positions are the placement of the first finger (flat or curved) and the use of the fourth finger. In general, the fourth finger use is not common but sometimes is required by the musical demands.

In the last stage of discussing the left hand, is the topic of about vibrato. Vibrato is first above all, an esthetical mean which corresponds to the musical needs. There are some technical methods for developing vibrato. The most comfortable method involves the usage

of the arm-pendulum movement, similar to the one in position changing and bowing. In this movement the thumb has to be kept quite loose. The hand executes circles. The other method is the hand vibrato which uses considerable amounts of forearm rotation, while still receiving some support from the upper arm. Here then the thumb must be kept more firm. They both have their uses but personally I find the arm-pendulum most comfortable. Vibrato is one of the most complex issues surrounding the string instruments because variety and musical applications are very wide in order to be described mechanically. Width, speed, direction are all aspects that are constantly changed and together with the different bow actions form and shapes our musical intentions.

### **Conclusion**

Through this research, I have summarize the knowledge I have gained during my masters studies. This knowledge is meant to clarify very specific actions and problems that I have dealt with in my own learning process with the instrument. There are many ways and methods of looking and thinking about instrumental playing, and cello playing in particular is difficult for one to systemize a general knowledge. These methods of instrumental playing are usually a result from different schoolings or individual experiences, and are meant to help realize musical needs and tastes. This theoretical method of playing focuses on gaining the ability to describe the most fundamental principles that guide us through a lifetime of learning. The main reason for pursuing this knowledge is to avoid dead ends in our learning. I strongly believe that if we understand the most basic laws of interaction between the player and the instrument, there are then countless possibilities for improvement and perfection. Through time, we as performers can apply this knowledge.

There are of course many areas for which I do not yet have knowledge. A very important aspect for me to have as future investigation is the interaction between the right arm and fingers, and the left arm and fingers. At a certain level of playing, we cannot separate them because they are acting as a unity together along with the whole body. It is not possible for the fingers of the left hand to be functioning well, while the right arm is cramping. Through my experience, I observed that whatever tightness happens in one of the hands it will inevitably influence the other one. The reverse is true as well – each hand or arm can help the other one during a technical difficulty.

Another issue that is still a topic of investigation for me is the level of conscious control during the practicing process. There is a big danger in becoming overly conscious about certain actions and making them problematic when there are not, in reality, causing a difficulty.

It is clear that the attempt to have conscious control while playing is purposeful only when directed to satisfy our musical ideas. Our musical motivations are, with no doubt, the most important element of instrumental playing. The technical solutions are aimed only to respond to the music's needs. The technique depends on the musical purpose. We should not, in fact, recognize a difference between instrumental playing technique and musical motivations. Rather, they are the two paths to one goal. The help of our body through muscles can execute the required movements only after the mind has a detailed and accurate musical understanding. At the same time, a performer cannot realize the musical intentions without proper understanding of the physical movements needed. The best approach to cello playing, or any other instrument, is a circular, constant interaction between the mind and body.

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