Just Relax…?

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Date of submission: 29-04-2016

Content

Story of my Research

Motivation
As musicians, we are always searching for new ways to improve our performance. We spend hours practicing to develop our technical skills. We read books and listen to music to get a better understanding of the music we're playing. We search for interesting pieces and techniques, which can help us to refresh our view on music.

At the beginning of my master's degree studies, I wondered myself: What do I want to learn? What do I aim for? What is my dream?

My dream was to play music without any physical limitations. On stage I aimed to feel free in my motions. I wanted to be able to make any musical decision, without experiencing any blockage in my body. Sometimes on stage I felt that I could not express myself the way I wanted to, because of physical tension in my body. I felt pain or cramping in my hands, arm and shoulders, my breath was restricted and my body had difficulties finding the right balance.

A piece in which all of these elements were very present was 'Lamentatio' by Giovanni Sollima. Sollima is an Italian cellist and composer. His music is influenced by different musical styles such as classical, pop, rock, jazz and Mediterranean folk. The character of the piece 'Lamenatio' is quite wild and powerful, which caused in me a lot of physical tension. The first time I performed the piece was during my final bachelor's exam at the Prins Claus Conservatoire (Groningen) in June 2014. During this performance I had difficulties finishing the piece because my muscles became sore.

In order to remedy this problem, I felt I needed to get deeper insight of the cause of this physical pain and begin to understand the term "tension".

The book by Victor Sazer (2003): 'New Directions in Cello Playing, *how to make cello playing easier, and play without pain'* gave me a tremendous amount of information about understanding tension and pain and how to prevent it. Much of this information is quoted from the book in the following section. However, I also include some of my own ideas.

Rates of pain and injury (see Sazer, 2003, p.1)
In reading this text, I was amazed to discover that most musicians experience pain from playing their instruments. Musicians have more injuries than football players. Indeed, Health Magazine reported that 65 percent of professional football players suffered serious career-related injuries compared to 75 percent of professional musicians.[1] Although playing the cello is not a contact sport and broken bones are not typical, other serious physical problems are common amongst cellists.

A 1987 study of more than 2,000 musicians in 47 professional orchestras found that 76 percent of musicians reported at least one medical problem severe enough to affect their performance. The study also found that medical problems are most prevalent among string players.[2]

Pain does not respect musical accomplishment. Cellists in all fields and at all levels suffer pain and injury, including celebrated artists (for instance Julian Lloyd Webber[3]), students, soloist, orchestral and chamber players, studio musicians and amateurs. Amongst musicians, cellists are known to have the highest frequency of back problems[4].

Causes of pain (see Sazer, 2003, p.5)
I wondered, is pain inevitable? Is pain the price we have to pay in order to play? Sazer (ibid) mentions that many cellists believe than pain cannot be avoided. They are convinced that their art requires some sacrifice of their bodies. The seeds of pain are most often planted during our earliest lessons. Young cellists too often learn techniques that ignore the natural laws of body motion. With practice, these unnatural playing patterns can become deeply ingrained. Over time, unnatural movements can lead to pain and perhaps more permanent injury.

[1] Health Magazine May/June 1993
[2] International conference of symphony and opera musicians, August 1987
[3] http://www.gazette-news.co.uk/news/local/clacton/11823929.Country_s_most_famous_cellist___forced_to_retire_by_neck_injury___brings_once_in_a_lifetime_musical_tour_to_Clacton/
[4] V. Sazer (2003): 'New Directions in Cello Playing, *How to make cello playing easier, and play without pain'* (p. 2)

Overuse and repetitive motions (see Sazer, 2003, p.6)
Sazer argues that pain can be caused by overuse. Overuse injuries can occur when body tissues are stressed by repeatedly pushing them beyond their limits. Although overuse injuries always require careful attention, it is only one of many causes of pain for musicians. We shouldn't only focus on overuse, but also take a look at the specifics of body-use as well.

Repetitive motions may lead to pain, but not always. The frequency, force, body alignment and manner in which they are performed can affect the degree of pain. When repetitive motions generate a great deal of tension they can cause pain. The effects are different, however as to when they create little or no tension. Vibrato is an example of repetitive motion that can release tension rather than creating it.

Improper body use (see Sazer, 2003, p.8)
The basic causes of pain and injury have more to do with how you use your body than with how frequently you perform various motions. Improper body use is the primary cause of pain and also increases the risk of overuse injuries.

Most pain is related to poor body balance: faulty sitting, immobility and pressing are the major causes of imbalance. Body imbalance creates muscle tension, which can prevent the body from functioning freely and can cause serious and painful problems.

Types of tension (see Sazer, 2003, p.8)
Sazer differentiates between functional muscle tension and excessive muscle tension. Functional tension makes sure that we're able to walk, sit, play the cello and not be sagging on the floor like a sack of potatoes. Functional tension occurs when muscles contract and lengthen to move the body or any of its parts. You do not feel this kind of tension, however as it is not excessive and causes no pain.

Tension beyond this functional level is excessive and counter productive. It can be physically damaging as well as musically limiting. Excessive tension anywhere in the body diminishes endurance and significantly increases the danger of injury. When using the term *tension* in this report I will refer to this type of excessive tension.

Injury
Unfortunately I suffered from a back injury myself at the beginning of 2015. During that period I was extremely busy with studying, rehearsals, concerts and traveling. By ignoring the pain I felt in my back by the end of a long day, I asked too much of my body without taking the right amount of rest or exercise. I gave priority to the playing, simply because I thought I didn't have time to rest.

I think the trigger point for this injury was a very long and exhausting flight between New York City and Amsterdam. The next day when I woke up I felt such a great deal of pain in my lower back that I wasn't even able to walk anymore. I couldn't find the right position to lie in bed since every body movement was extremely painful. My doctor examined me and diagnosed me with lumbago, which is a very general diagnosis for back pain, but did not identify a specific cause. He recommended slowing down for a couple of days and to take painkillers. It should be over in three days, he said, however, after three days it hadn't gotten any better.

In the following weeks, I saw several physiotherapists, tried dry-needle therapy, which is a technique physiotherapists use to treat myofascial pain. The technique uses a 'dry' needle, one without medication or injection, inserted through the skin into areas of the muscle, known as trigger points.[5] Physiotherapists use dry needling with the goal of releasing or inactivating trigger points to relieve pain or improve range of motion. Dry needling should improve pain control and reduce muscle tension, which can help speed up the patient's return to active rehabilitation. Unfortunately it didn't help in my case and actually made the pain worse. I found out later that the muscles in my lower back were extremely tense because they were trying to protect the source of the pain. With the dry needle therapy the muscles were forced to relax, which did release the pain for a moment, but then it came back twice as hard.

I also had x-rays taken in the hospital since the doctor thought it might be Bekhterev's disease. This is a chronic inflammatory autoimmune disease of the axial skeleton. It mainly affects joints in the spine and the sacroiliac joint in the pelvis. Luckily the scans didn't show any signs of this condition.

[5] http://www.moveforwardpt.com/resources/detail/dry-needling-by-physical-therapist-what-you-should

As I was having difficulties walking, I wasn't able to take care of myself. I moved back to my parent's house in Amersfoort and reached out to our family physio/manual therapist. In order to help me get better, he suggested that I start using my body again.

Since my body was extremely stiff and all type body movement was very painful it wasn't much fun in the beginning. It started with very subtle movements; just rotating my hips and pelvis. I wasn't allowed to sit for more than just 10 minutes at a time because that would make me stiff again. And when I sat down I had to make sure that I was continuously moving in the ways prescribed by the therapist.

My days were all about body movement, starting with little walks and small movements. After a while I was ready to start swimming, and doing exercises which made my core stronger. In one month's time I was more or less pain free. The improvement was amazing!

I slowly started playing the cello again. It started with just five minutes per day, then ten, fifteen etc. I made sure that I didn't sit down for too long (no longer than approximately thirty minutes at a time) and that I did stretching exercises between sessions to prevent stiffness.

In total it took me three months to get back to my normal hours of practice. During this entire period I was understandably concerned that I wouldn't be able to play the cello again at all. At that time I was twenty-three years old and I felt my body was already protesting from the many years of effort and strain. I realized that if I wanted to be a professional cellist and maintain a life-long career, I would have to make sure that I took extremely good care of my body. I need to incorporate all the elements that could help me prevent injuries in the future.

I needed to find something that could help me both in the short- and long-term. I wanted to find out if I had done something wrong while playing the cello, which might have caused the injury. Also I wanted to get a better understanding of how to use my body in a more effective way. This is why I started Alexander Technique lessons with Doris Hochscheid. Since she's a cellist herself, I thought she would be the perfect teacher. She has an incredible amount of knowledge and understanding of the body movements we cellist need while playing.

Along with Alexander Technique I started working out with a personal trainer/physiotherapist who was specialized in lower back injuries. He helped me to improve my body strength, especially in the core area. Through him, I learned that in order to play the amount of hours required as a musician, it was important not only to work on my technical skills but also to take care of my body and have good physical strength.

This personal story was the core purpose behind my research. It was of great personal importance to develop and incorporate elements of good physical movement from different areas into my daily practice and playing in order to help me avoid injury. This led me to my research question:

'How can I find the right balance between muscle tension and relaxation to be able to play the piece 'Lamentatio' by G. Sollima without any physical limitations?'

Discoveries

When searching for literature I found the previously mentioned book by Victor Sazer (2003). This book provided a great deal of information about understanding pain and tension, preventing injuries and how to reduce tension via exercises and demonstrations. I helped me to understand my body and how it's naturally inclined to move. Understanding natural body movement is essential for finding the right balance between muscle tension and relaxation. Another book that provided a lot of insight was 'The Alexander Technique for Musicians' by Judith Kleinman and Peter Buckoke (2013). As I mentioned, I started Alexander Technique lessons after suffering from my back injury. This book offered a deeper insight into the method and helped me get more out of the lessons.

There are many reasons why I chose Alexander Technique rather than any other method. Of course there are similar techniques which are also known to be very helpful in developing physical awareness and reducing tension such as Feldenkrais, Mensendieck, or sports like Yoga or Tai Chi. What convinced me was that I wished to work with a professional cellist who could demonstrate knowledge about cello playing as well as a recognized movement approach and address my struggles with sitting properly, body posture, body movements etc. Indeed, when I was asking my network for advice on a method that could help me, many people immediately recommended Alexander Technique lessons with Doris Hochscheid. From a personal point of view and also in relation to the requirements of this research, it didn't seem wise to try many different techniques at

once: When you're trying to solve something in three different ways, it can be difficult to see clearly which one is the most effective and actually helping, and I really needed help as fast as possible. In fact, once I started the lessons with Doris there was a very quick improvement in my body posture and body-use. Along with the literature and strength training, I felt that her approach was extremely helpful for me and that my movement was greatly improved. Things were finally falling into place for me. Further to this, it was also my plan to select the most effective aspects from wider literature, and my physiotherapy sessions and combine them into one general method that could be used to help not only myself, but also other cellists.

Along with the literature and lessons, I also had interviews with several cellists including Giovanni Sollima, the composer of 'Lamentatio'.[6]

During the research I discovered that there are some basic elements that could help me reduce physical tension. These elements were:

- Breathing
- Gravity, Balance and Body-use
- Sitting and Placement of the Feet
- Sources of Physical Power

Based on these principles I created what I call the Pre-playing Routine (PpR) to help me get in the right physical and mental state just before I started to play. I'll explain the PpR in the chapter *'Documentation and Description of the Artistic Result'* (see page 7 of this report) and the elements mentioned above in the chapter *'Intervention Cycles'* (see page 10).

Another great tool that I found during the second year of my research was the posture peg: The use of this invention allowed me to sit straight behind my cello. Before this, I was not able to sit straight due to the C-peg which was pinching in my neck. Installing this posture peg provided a solution that I will profit from the rest of my life as a cellist. I will discuss the posture peg more deeply in my *third intervention cycle* (see page 29).

Development
The method described in this report was developed to be used not only by myself but also by other cellists or instrumentalists struggling with physical tension. It contains exercises and demonstrations that can help us to understand our bodies and the way it is naturally inclined to move. I include the method as an appendix (see page 37).

Besides the PpR, I developed a very solid base for myself as a professional cellist. When I play I now feel much more relaxed and well balanced. Still, I can experience some physical tension while playing the cello, but thankfully I no longer have back pain. Indeed, I believe that a bit of tension is completely normal and even necessary for playing. However, too much tension comes at a price. Now, I'm able to control changes of tension and balance in my body. This is because I now have a method that has given me the ability to relax whenever I want to. For me, this is the freedom I wished for at the beginning of my master study. In fact, it is the freedom of choice in how I use my body. My instrument and the music do not rule me. I am in control.

[6] The interview can be found in Appendix 2 (page 50)

B. Documentation and Description of the Artistic Result

Since the outcome of my research may help other cellists in finding the right balance between muscle tension and relaxation, I decided to write a method. The four basic elements which helped me to reduce muscle tension were:

- Breathing
- Gravity, Balance and Body- use
- Sitting and Placement of the Feet
- Sources of Physical Power

I explain each of these elements one by one in Appendix 1 (page 37) and include exercises and demonstrations that can help us understand them and their application. They are also included in the Intervention Cycles. It may be redundant, but in this way you see which groups of exercises I did in which order and their effect along the way.

Getting it into practice: Pre-playing Routine (PpR)

"The legs and the abdomen; that's what produces a good sound!" – Sviatoslav Richter[7]

Based on the principles I discuss in Appendix 1 (page 37), I created the PpR to help myself achieve a good physical and mental state just before starting to play. Many top athletes also use what sport-psychologists call a pre-performance routine. If you watch sports like basketball, football, baseball or tennis for example, you'll see them in action. For instance NBA-star Rick Hamilton always bounces the ball twice forward and then he brings it to the side before shooting a free-throw.[8] Musicians benefit from this sort of routines as well. I know that cellist Siets-Jan Wijenberg[9] always eats a banana before playing, and my former cello teacher Jan-Ype Nota lies down for a couple of minutes in the dressing room before a big concert and tries to focus on his breathing.

I created my own Pre-playing Routine to use before a concert or audition, but also before practice. I describe it below in steps as a method because during the process of this research I also had the opportunity to teach the routine to other cellists and refine the ideas that I had developed for myself.

Pre-playing routine
Step 1. Find a balanced way of sitting with your cello
Step 2. Place your feet on the ground in the way that you feel the stable, comfortable and grounded
Step 3. Take a couple of deep, calm breaths in the diaphragmatic way of breathing
Step 4. Do a quick body scan and search for any physical tension. Release any tension you find
Step 5. Hear the music in your head and play! Go for it!

Step 1. Make sure that you're sitting on a comfortable chair with the right seat height helps us to find a balanced way of sitting. Feel the contact you have with your sitting bones on the chair. Try to lengthen your spine by thinking upwards. Think of you head floating like a balloon above your spine.

Step 2. Place your feet on the ground in a way that you feel the stable, comfortable and grounded. Feel the contact you have with your feet on the ground. Feel your toes spreading out and taking as much surface as they need to feel stable. Keep your heels on the ground and place your feet a little in front of your knees.

Step 3. Take a couple of deep, calm breaths in the diaphragmatic way of breathing (see Appendix 1, page 38). Feel your belly expanding while you inhale and contracting when exhaling. Repeat this a few times. You may close your eyes if you wish.

Step 4. We must release any type of excessive muscle tension before we play. We can achieve this by doing a body-scan. You can start from your feet to your head or the other way around. Scan your toes, feet, legs, bottom, belly, back, arms, neck and your face. Try to release the tension. When you're able to breath deeply and completely you're tension-free.

[7] S. Richter (1998) - 'The enigma', NVC Arts, U.S.A.
[8] www.bulletproofmusician.com
[9] http://www.sietsejanweijenberg.nl

5. Hear the music in your head. How does is sound or feel when you nail the opening? As soon as you can hear it or feel it you will be more engaged and ready to let loose and trust your body to do what you've trained it to do.

While playing you might find yourself getting out of balance or holding your breath during a difficult passage. It's okay to have these responses because now you are aware of them. Try to come back to these basic elements in order to help you reduce tension.

C. Reflection of the Process and Artistic Result

Artistic Result
As I'm writing this artistic research report and over viewing all the steps I took along the way, I have to say I'm quite proud of my work. The progress I made during the whole process is very clear to be seen on the reference recordings. But most importantly: I **feel** differently. When I see myself playing on the zero recording, I see a cellist who is struggling a lot with physical tension. She's trying to survive and finish the piece even as she's fighting her pain. In fact, I now find watching this video very distressing because it takes me back to a time when I was out of control of my playing. However, now when I see myself play, I see an artist who is capable of making musical decisions without interference from a tense body. My body is able to execute the physical movements that I need it to do. Still, I experience physical tension while playing the cello, however I think this is completely normal and even necessary. Now I can trust my ability to relax whenever I want to. For me this is the freedom I wished for at the beginning of my master study.

After the workshops I did in Zutphen[10] in which I taught the elements which could help us reduce tension and the PpR, I realized the significance of my work for other cellists. I noticed that it's extremely important for each musician to have a clear understanding of his or her own physical tension and how their body reacts to it. It was wonderful to see the difference it made for other cellists and to receive such great feedback from them. I find I can now easily identify cellists who are struggling with physical tension. Also, as a teacher I try to not only work on technical skills with my students, but also focus on body posture, balance, breathing etc. I think it's extremely important for beginner cellists to have these elements as a basic skill. I believe that if I had had the same type of training from the beginning perhaps I could have avoided the pain and injury that I had experienced.

Codarts asked me to present my research at the Research Festival on the 9th of March 2016. I was overwhelmed by the positive reactions and interesting questions I received from attendees. I've spoken with cellists, violinists, pianists and other researchers who were not even instrumentalists themselves. They all acknowledged the importance of good body-use and the balance between tension and relaxation. During my presentation I also noticed how much I enjoyed being in front a group sharing my knowledge and experience with others. Maybe besides being a performing artist, there is a future for me as workshop leader/presenter. My main-subject teacher Jeroen den Herder has been a great help during the process with our endless interesting conversations about the subject. He has allowed me the opportunity to give workshops to the cello students who are studying at the Cello Academy in Zutphen. This would be a great honour and I will definitely pursue it.

The research process
At the beginning of the research my work was interrupted by my unfortunate back injury. Because I wasn't able to play the cello, I became quite frightened about my future. I even had difficulties walking: what would that mean for my future career? For my life? Thankfully, with a lot of effort I recovered within a few months time. Once I picked up my research again, I realized this was not something I was doing because Codarts required it: This is something I **needed** to do.

I listened very careful to the reactions my body gave me, when adjusting to and incorporating elements. The most effective change I made was to install a posture peg on my cello that allowed me to sit straight behind my cello. This is a solution that will benefit me for the rest of my life. I'll explain in detail about the posture peg in the chapter *third intervention cycle* which is to be found on page 29.

The PpR was also very beneficial in helping me to achieve a good mental and physical state before starting to play. Doing the PpR before starting to play is extremely important for me. It means that I have already started my performance, even before I play a single note. It helps me to connect with my instrument and to be "in the moment". While having this silent moment, the attention of the audience will be drawn towards me, meaning that they are also preparing to listen to me. This can also help to create a better connection between myself and my audience.

Overall, the research really taught me to be creative in finding solutions for things that are not working out so well. I realized that struggling with tension didn't mean that I was a bad cellist: It meant that I was a cellist who needed to learn more and then make better choices. The research helped me clarify these choices and pushed me to find even better ones. I'm only human and I know I have a lot more to learn, but now I know clear ways to

[10] I'll explain more about the workshop I did in Zutphen in the Third Intervention Cycle which can be found on page 30.

find information and answers to my questions. This is my foundation for hopefully a long, successful and healthy career.

D. The intervention cycles

In this section I will describe the three intervention cycles I've executed during my research process. I will discuss the items in the following order:

- The recordings
- The feedback on the recordings
- The methods and analysis of the methods I've applied
- Reflection and future plans

First intervention cycle

First reference recording
YouTube link: https://youtu.be/TqZ6yo7vyzk
Memory-stick: Track 1
Date: November 14th 2014

The piece you see me performing in the first reference recording is the piece 'Lamentatio' by Giovanni Sollima. Sollima is an Italian cellist and composer who is currently predominantly performing baroque music and his own compositions on stages around the globe. His own compositions are influenced by different styles such as classical music, pop, rock, jazz and Mediterranean music. The character of the piece 'Lamenatio' is quite wild and powerful, which in the beginning caused me a great deal of physical tension. The first time I performed the piece was during my final bachelor exam at the Prins Claus Conservatoire (Groningen) in June 2014. During this performance I had difficulties finishing it because my muscles would eventually get tense and sore.

Because of my motivation (to be able to play pain-free and without physical limitations) I chose this piece as my starting point. In order to analyze my physical response while playing, I recorded myself with two different cameras which showed two different points of view of my body. One camera recorded me from the front which gave a close-up of my upper body. The second camera was set up at the side which gave a full overview of my body.

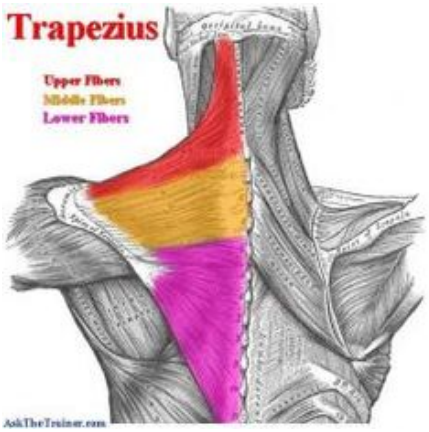
Feedback

Feedback on the zero recording
For feedback, I got in touch with Janine Stubbe who is the Lectoraat in Health and Well-being at Codarts..She analyzed my recording and gave me feedback. I also asked feedback from my main-subject teacher Jeroen den Herder.

Feedback Janine Stubbe
"I've watched your recording several times and I have to say it is very amusing. What a beautiful piece! I can imagine that playing this piece is physically very challenging. I analyzed it from my scientific point of view. As you know I cannot say anything about the technique, I can only give feedback on your posture. The aspects which struck me the most:

- Your left shoulder is most of the time placed lower than your right shoulder. This can mean that your back is not in a straight position, but bent to the left. It would be interesting to make recordings from behind. This way you have a better view of what's happening with your spine.
- It seems that your breath is not cohesive with the first tempo change. At the 1 min. and 49 seconds mark you have a short break, then I can see you taking a very deep breath. By not having a consistent way of breathing, you will lack a sufficient amount of oxygen in your body which makes your muscles sore. It's very important to pay close attention to this.
- At the 2 min. and 18 seconds mark I notice that you're starting to get tired. You're facial muscles are contracting.
- From the third tempo change onward (around 3 min.39) I can notice that you're really starting to struggle. Your facial muscles are very tense. You're leaning very much towards the left which makes the difference between your left and right shoulder even bigger. A possible reason for the right shoulder to be lifted is excessive muscle tension in the musculus trapezius. (See red part of figure 18).

- You mention feeling pain during the playing. I'm curious where the pain occurs in your body. Is it indeed the musculus trapezius? In that case it would be very interesting to make a recording from the side and from behind to have a closer look of this part of the body during the playing."



(figure 18)

Feedback Jeroen den Herder
"Your upper-body seems to be out of balance. I'm concerned by your breathing, it seems to be restricted. When you're making an up bow, your right shoulder has difficulties staying low. You're not letting gravity do its job. You're lifting the right shoulder which makes it stiff. When you play the pizzicato part your shoulders are in its right place."

Own feedback on zero recording
I think this reference recording clearly shows what's happening on stage. The most striking part to me is the level difference between my left and right shoulder. My left shoulder is really low compared with the right one. I also noticed that my right shoulder is quite stiff. It doesn't look very supple, which makes the right arm having difficulties making fluent motions. During the piece you see my arm cramping more and more. Also my right hand should be more flexible.

Methods and Analysis

Interviews:
Giovanni Sollima, the composer of the piece 'Lamentatio' played a concert on the 9th of December 2014 in de Doelen, Rotterdam. I had the opportunity to meet and interview him after the concert. I asked him if he had the same issue concerning tension while playing his own piece. Luckily for him he didn't have the issue, but he gave me some interesting insights about tension. He mentioned it probably had to do with my way of breathing. It surprised me that he mentioned this, since he never heard/saw me play. The whole interview with Giovanni Sollima can be found in Appendix 2 at page 50.

Shortly after presenting my future plans during my artistic research proposal exam in the end of December 2014, I suffered from a back injury. As I mentioned in *The Story of my Research* (page 3), I wasn't able to play the cello for two months. With the help of physical exercise and Alexander Technique lessons, I slowly started to regain my ability to play the cello again. I realized that my choice of subject for my research was a very funny, but strange coincidence. Now I realized that this subject was not only a special interest of mine, it became also necessary to incorporate all the elements which could help me reduce muscle tension whilst playing the cello.

Lessons and Literature

Alexander Technique
As previously mentioned I started Alexander Technique lessons with Doris Hochscheid. I learned to use my body in a much more effective way. I was getting more aware of my habits, which negatively affected the shape of my back. We took a look at the way I was sitting with my cello and tried to make some adjustments which helped me to be more relaxed and well balanced. The placement of my feet made a huge difference for me. I have added a recording of an Alexander Technique lesson which was made on the 9th of March 2015 and shows these elements. The recording is to be found on the memory stick as track 5 and within this YouTube link: https://youtu.be/HtXjt2gY03M.

Doris wasn't the only one who showed me the potential importance of Alexander Technique. On the 2nd of March 2015, Codarts organized a masterclass with Peter Buckoke. Buckoke is an Alexander Technique teacher in London and co-writer of the book: 'The Alexander Technique for Musicians'. I had the opportunity to play the piece 'Lamentatio' for Buckoke and he immediately noticed that my legs were very tense and that I lifted my feet while playing. He suggested having a higher awareness concerning the placement of my feet and relaxation of my legs whilst playing. He also mentioned the possibility of using posture pegs on my cello in order to be able to sit straight. I made the decision to adjust my cello with the posture peg in my third intervention cycle (page 29). With permission I recorded the masterclass. I've made a short audio file which demonstrates me playing for Buckoke. This file can be found on the memory stick as track 6.

Due to the feedback I received from Janine Stubbe and Jeroen den Herder after my first reference recording, I wanted to change a lot of aspects which concerned my upper-body. Tension in my arm, shoulders, face, I thought that my upper body was the problem zone. However, Doris Hochscheid and Peter Buckoke's insight in the possible source of my tension made me decide to primarily start focusing on the lower half of my body. I didn't want to focus on all the problems at the same time. Besides, it seemed logical to me to start with the root. It's like a tree or a building: when the root or foundation isn't well balanced the whole structure isn't stable and then there are consequences.

Experiment
While collecting information I was extremely happy to discover the book 'New Directions of Cello Playing' by V. Sazer. With the insights I gained from this book I decided to start working on three different aspects which could help me reduce muscle tension while playing the cello. The elements were:

- Breathing
- Way of Sitting
- Placement of the Feet

I did an experiment which helped me incorporate this new information into my playing. For seven days I recorded myself playing the first three minutes of the piece 'Lamentatio' by G. Sollima. The recordings can be found on the memory stick as tracks 7 - 16.

I changed my way of sitting, placement of my feet and focused on my breathing and relaxation of the legs. I wrote all my observations in a diary. This way I could evaluate whether I was improving or not. The whole diary can be seen in Appendix 3 page 51, as well as the track numbers from the memory stick recordings and the YouTube links.

Much of the background information I provide in the following section is quoted from the books: V. Sazer – 'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* and J. Kleinman and P. Buckoke – 'The Alexander Technique for Musicians'. However, I also include my own ideas from my experience as a cello player and through my observations of other cellists and through a long period of self-experimentation of various methods.

Breathing

'Breath is the life; and breathing capacity is the measure of life.'
F.M. Alexander[11]

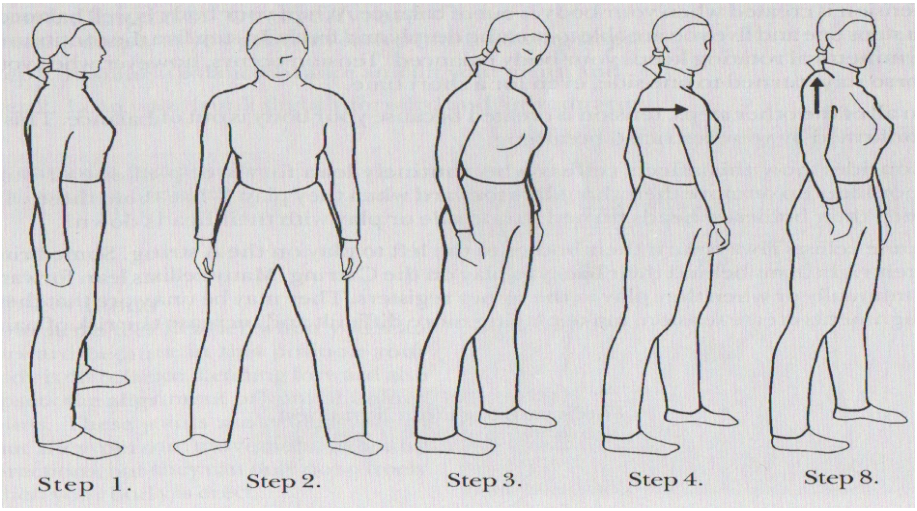
What I've noticed is that we as string players are rather poorly educated in the habit of breathing correctly while playing. To me there is simple logic in this fact, and it's due to the principal that our breath is not directly related to the sound-production on our instruments. As mentioned before my breath is sometimes restricted during my performance and at times I even hold my breath while playing! The possible outcome of not breathing is obvious: we cannot expect anything in our bodies to work well. Without enough oxygen we cannot think straight, our muscles lose strength and accuracy in movement, and there can be a build up of lactic acid.

So breathing correctly while playing is not only very important for our bodies to function well. It's also a very effective diagnostic tool in order to identify areas of tension in our bodies: When our bodies are completely well-balanced, we are tension-free and able to breathe deeply and completely. In this state the body is at its peak of efficiency. When tension is present somewhere in our body, our breath is immediately restricted. An exercise

[11] J. Kleinman and P. Buckoke (2013) – 'The Alexander Technique for Musicians', London 2013 (p. 91)

which helped me identify the sources of tension is *The Breath Test***.** The Breath Test is an important diagnostic tool. It is a simple and effective way to tell if our bodies are tension-free or not.

Exercise 1: The Breath Test
Breathe deeply as you perform each of the following steps.
Step 1. Assume a balanced stance
Step 2. Lean your head forward
Step 3. Lean your head to one side
Step 4. Turn your torso a few degree to one side
Step 5. Rotate your torso gently from side to side with even, continuous motions
Step 6. Lean your torso slightly forward
Step 7. Hold your elbow a bit behind your back
Step 8. Lift one or both of your shoulders
Step 9. Pull one or both of your shoulders forward
Step 10. Bend your wrist downward
Step 11. Experiment with other body positions



(Figure 1)[12]

Observations
I experienced that tension was created when my body was out of balance. This happened in all the steps except for step one and five. In step five the continuous symmetrical rotating kept my body balanced. Tension occurred, when my torso stayed turned to one side. In all the other steps, tension was created because of my body being out of balance. I noticed this because my breath was restricted.

By discovering that tension in my body is directly related to my breathing I first tried to become more aware of my breathing while playing. I realized that when I tried to relax my legs for instance, my breath was deeper and calmer. So by relaxing I was able to control and improve my breathing.

Way of sitting

The book 'New Directions in cello playing' by V. Sazer explains a different way of sitting compared to what I was used to. I quote: *"Because cello playing requires sitting in an upright position, cellists' seats must likewise maintain a wide enough angle between the thighs and trunk to avoid back strain. Your sitting bones can then face comfortably downward and provide the same foundation for your body as when you are standing. This angle can be achieved by making your seat higher in the back than in the front to allow your knees to be several inches below your hips. There are several ways to angle your seat. One way is to use a firm, wedge-shaped cushion which is about two-and-one-quarter inches thicker in the back than in the front."*[13]

[12] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.*' (p. 25)
[13] V. Sazer (2003) – 'New directions in cello playing' – *How to make cello playing easier and play without pain.'* (p. 60)

Luckily I already had a wedge-shaped cushion at home which I used to have on my cello-case as part of a carrying system.

(Figure 2)[14]

During this intervention cycle I practiced sitting on this wedge-shaped cushion. Since my lower back was still very sensitive due to the injury I was recovering from, I didn't always feel quite comfortable using it. It put a lot of pressure on my lower back and it affected my flexibility of moving my pelvis during the playing. So after a couple of weeks I decided not to use it any longer.

Placement of the feet

"When you're not well-connected to the ground, you tighten your upper body to compensate for the support that you don't feel from the surface under you. When you do feel grounded, your upper body can take its support from your skeleton, making your upper body, arm and hand movements easier and more fluid." – Ralph Strauch, PhD[15]

"Even the simplest movements of the arms can be carried out properly only when the position of the legs is corresponding correct." – Carl Flesch[16]

Back pain is fairly common amongst musicians, but the rate of back pain is higher amongst cellists than within any other group of musicians[17]. A major cause for cellists' back pain is faulty sitting. Sitting is more complicated than standing. Standing permits greater freedom of movement. It allows your body to maintain better balance and to shift your weight naturally as you move your arms. This is why violinists and other instrumentalists usually prefer to stand when playing solo.

When sitting, the body's balancing mechanism is less obvious. Contact with the seat obscures the direct connection between the feet and the rest of the body. Unfortunately, many cellists are unaware of how important their feet and legs are while playing their instrument.

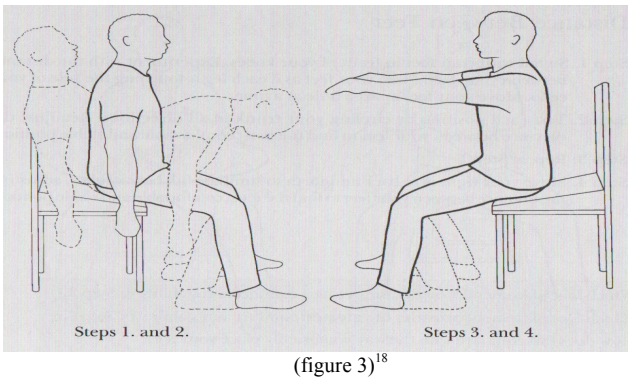
Unless the feet can fully support all the body movements, the body cannot be completely balanced. When the feet are not properly placed, the knee and hip joints tend to lock, causing a loss of mobility. Again, it's like a building; if the foundation is not well constructed the whole building is out of balance.

The next exercises helped me to achieve a better placement of the feet.

Exercise 2: Foot placement when sitting
This exercise explores different foot placements without the cello. Perform the breath test with each step.
Step 1. Sit tall on the front edge of your chair and place your feet:
- Behind your knees
- Straight down from your knees
- Various distances in front of your knees

Step 2. Test each position by moving your trunk forward and backward. Find the position which feels most comfortable and stable
Step 3. Repeat step one
Step 4. Raise your arms to find the foot placement that makes your arms feel the lightest.

[14] http://www.forrmobility.co.uk/Products/DailyLivingAids/BedChair.html
[15] Certified Feldenkrais Practitioner, www.somatic.com
[16] C. Flesch (1924) – 'The art of Violin Playing', Carl Fischer, Inc, New York
[17] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.*' (p. 55)

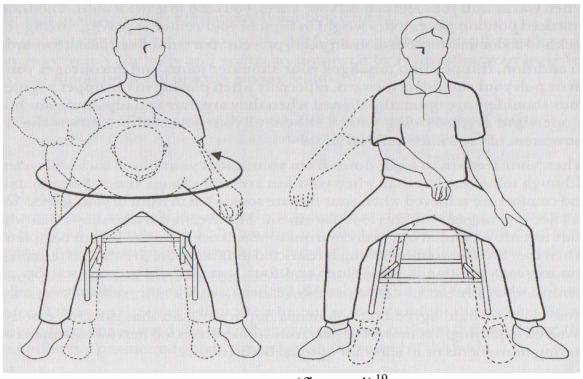


(figure 3)[18]

Observations
When I sat with my feet behind my knees, I had the tendency to lean forward. Since this position placed extra weight in front of my center of gravity, it forced my back and abdominal muscles to strain just to prevent my trunk from falling forward. This made it very difficult to breath properly.

I felt more stable and comfortable when I placed my feet a little in front of my knees. My balance was strongest with this foot placement. Also the Breath Test showed that when my feet were placed in front of my knees I could breathe freely.

Exercise 3: Distance between feet
This exercise explores different foot placements without the cello.
Step 1. Sit tall with your feet in front of your knees. Experiment with the distance between your feet. Place your feet as if each leg is touching the side of your cello. Move your feet apart a little at a time.
Step2. Test each position by circling your trunk in all directions. Readjust the distance between your feet to find the most comfortable and stable position.
Step 3. Repeat step 1.
Step 4. Move your right arm back and forth to simulate full bow strokes, adjusting the distance between your feet to find the most comfortable and stable position.


(figure 4)[19]

Observations
Widening the distance between my feet makes cello playing easier. This alignment provides a broad enough base to maintain the best balance. It also allowed my legs to support the entire span of my bow strokes.

Reflection and future plans

At the end of this first intervention cycle I already had the feeling that my lower body was much more relaxed and well-balanced than before. In the past I wasn't really aware of the fact that I lifted my feet nor the presence of tension in my legs. I discovered the positive influence it had on my playing. Still I had difficulties keeping my legs relaxed and maintaining a steady way of breathing; I had to remind myself to do so all the time. In the future I want to focus more on the upper-body by searching for ways to be able to sit straight behind my cello. I also want to gain a deeper insight in how to breathe correctly while playing.

[18] V. Sazer (2003) –'New Directions in Cello Playing, *How to make cello playing easier and play without pain.'* (p. 65)
[19] V. Sazer (2003) –'New Directions in Cello Playing, *How to make cello playing easier and play without pain.'* (p. 67)

Second intervention cycle

Second reference recording
YouTube link: https://youtu.be/a1RbUhnaQmc
Memory stick: Track 2
Date: April 20, 2015

Feedback

Feedback on the second reference recording
I asked Janine Stubbe, expert in body movement at the university of Amsterdam, to give feedback on my second reference recording. Unfortunately I haven't been able to contact her after the first intervention cycle. I also asked feedback from my teacher Jeroen den Herder. Since I started Alexander Technique lessons in February 2015 with Doris Hochscheid, I asked her to analyze my recording. Unfortunately I wasn't able to make an appointment with Christiaan van Hemert who helped me to record the first reference recording. I've made the recording at home with my iPhone, so it doesn't show multiple angles.

Feedback Jeroen den Herder
"It's beautiful to see the progression you've made in such a short time. When I look at the second recording I see a unified body posture. This is something which I couldn't see at the first reference recording. Your shoulders are much more relaxed and they stay on the same height. It seems to me that this is the way to play the cello if you still want to play when you're ninety years old."

Feedback Doris Hochscheid
"I've compared the zero recording with this video. You've made a lot of progression! On the zero recording I've noticed that the left side of your body is pulled down. From your sitting bones to your shoulder you squeeze your body together which influences this side of the body a lot. This is why you raise your right shoulder and your breath is restricted. The second video is much better. It looks already much more relaxed."

Own feedback on reference recording
It was striking for me to see the difference between the zero recording and the second one. During the last intervention cycle I had focused on changing my lower body, the foundation. I think changing the root created a very solid base and immediately affected my upper body as well. My shoulders were much more relaxed. I did not look downward with my head as often as I did during my first recording and I no longer saw any facial stress. My next focus was to be on general body posture, targeting body balance and gravity. I wanted to approach the body as a whole, since upper body and lower body are effecting each other. I also wanted to gain more knowledge on breathing correctly while playing.

Methods and Analysis

Much of the background information I provide in the following section is quoted from the books previously mentioned by Sazer (2003) and J. Kleinman and P. Buckoke (2013). However, I also include my own ideas from my experience as a cello player and through my observations of other cellists and through a long period of self-experimentation of various methods. With the insights I gained from the books I decided to start working on two different aspects which could help me reduce muscle tension while playing. The elements were:

- Gravity, Balance and Body-use
- Sources of Physical Power

To learn more about being able to control my breath while playing I consulted the book: 'Cello Practice, Cello Performance' by Miranda Wilson (2015). I did a three-day experiment practicing the exercises which are mentioned in the book.

Gravity, Balance and Body-use

"In the living body not even sleep can bring the center of gravity to a perfect standstill, and moving about will make it swing considerably" – Otto Szende and Mihaly Nemesurri[20]

Gravity is a constant downward force. It pulls your head down towards your neck and your trunk down towards your hips. It also compresses your spine and if not resisted makes your body sag. You can cope with gravity by either actively lifting your body or passively submitting to it.

If you would submit completely, of course, you would be lying on the floor. Just being alive requires lifting. When your body is lifted and well balanced, your spine and joints expand and you are able to breathe without restriction. With this body alignment, gravity can become an asset rather than a liability.

What we mean by *balance* is an efficient use of the body in relation to gravity. Many people misunderstand this approach as 'relaxation'. Although total relaxation may be appropriate for resting or meditation, it is hardly the condition to be in when we are playing our instrument. Because this relaxation can lead to a static heaviness and downward pull. Balancing is completely different from being static. To play, you must be free of tension, but also alert, balanced and ready for action.

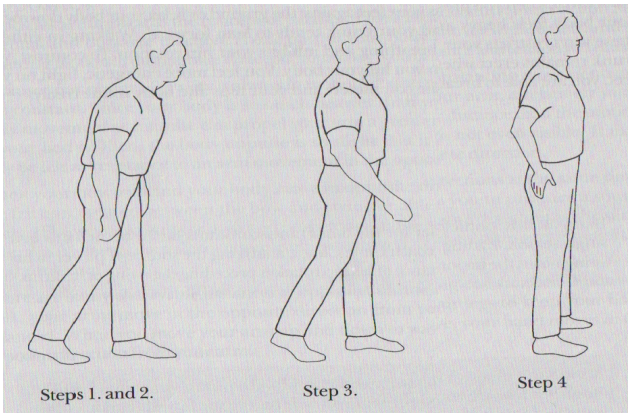
The human body seeks balance and is always in motion. Its centre of gravity is constantly shifting in a series of continuous counter-balancing reactions. The body is like a flexible combination of several scales. Allowing this balancing process to function freely is key to playing the cello more easily and avoiding tension. Anything that interferes with your total body-balance creates tension and the potential for pain.

Most cellists use their bodies in one of these three ways when playing:

- They either apply downward pressure.
- They release body weight downward.
- They lift their bodies.

Although many cellists combine these approaches, it is useful to explore the characteristics of each.
The next exercise illustrates three ways of using our bodies. The distinctions are observable in all activities, including walking and cello playing.

Exercise 1: Three ways of walking
Perform the breath test with each step.
Step. 1 Walk, pressing your feet downward against the ground
Step 2. Walk, relaxing your body weight downward
Step 3. Walk, maintaining a balanced stance. Focus on lifting your body. Be sure that your pivot from the heel to the ball of each foot
Step 4. Repeat the first three steps, holding your hands on your hips.



(figure 5)[21]

[20] O. Szende and M. Nemessuri (1971) – 'The physiology of Violin Playing, London,'
[21] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 35)

Observations
I noticed that when I pressed my feet against the ground or relaxed downward, my body felt heavy and my trunk had the tendency to lean forward. Walking in either of these ways restricted my breathing and made it difficult to rotate my hips. When I lifted my body, I was able to keep my trunk straight. It felt lighter, energized, and my breath was free and complete.

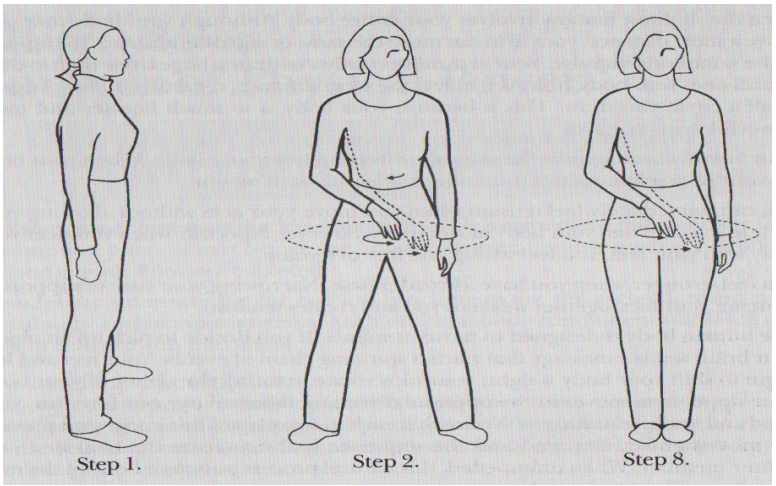
Opposites
Opposites are implicit to the concept of balance. Physics teaches that every action has an equal and opposite reaction. If one part of your body moves without a counter-balancing motion in the opposite direction, your body is off balance and tension is created.

Because your centre of gravity is always in motion, counter-balancing movements are also constant. Since your body is so much heavier than your arm, a relatively small body movement or impulse can propel your arm a greater distance than the motion of your body. Often the body impulse is so light that it is not even visible. It may only be felt as resistance to an arm movement in the opposite direction.

When your bow arm and your body move in opposite directions at the same time, the friction created between the bow and string enables you to produce a sound easily. If however, your bow arm and body move in the same direction at the same time, this friction is partially or completely neutralized. It then takes greater effort to produce sound.

There are many examples of opposites balancing one another. When you walk, your arms move in the opposite direction from your legs to keep your body balanced. When you move your arm up and down to wave, your hand moves in the opposite direction from your arm.

Exercise 2: Balance in motion
This exercise illustrates how movement affects body-balance.
Step 1. Assume a balanced stance
Step 2. Draw large and then small circles in the air in front of you with your right arm. Allow your body to move as it is naturally inclined to do.
Step 3. Draw spirals, figure eights and other shapes of varying sizes. Notice how your body moves. Be aware of the sensations in your feet and the rotation of your hips.
Step 4. Draw circles or other shapes but do **not** allow your body to move.
Step 5. Draw circles or other shapes. Initiate your movements by steering your body with your feet. Allow your arm to react to the movements of your body.
Step 6. Experiment with other motions, such as turning a page of music, drinking a glass of water or bowing with the right arm.
Step 7. Move your left arm as if shifting up and down the whole length of your cello's fingerboard.
Step 8. Put your feet together and draw large and small circles.



(figure 6)[22]

[22] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 39)

Observations
Immediately, I felt tension when I didn't allow my body to move naturally. I felt the tension occur throughout my whole body but especially my legs. I felt strong when I had a broader base. Narrowing my base of support by bringing my feet together weakened me and created tension. I could image that this is very similar to playing the cello. When I did not allow my body to move as it was naturally inclined to, it created a lot of unwanted tension.

Sources of Physical Power

"Only this impulse coming from the center of the body instead of each extremity will group different movements in a unified whole" – Pablo Casals[23]

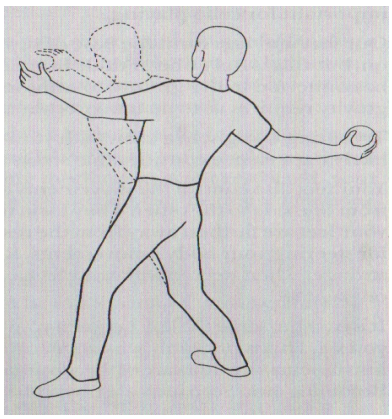
A common assumption is that muscles are the only source of the body's power. This assumption isn't true however, because even the strongest person is weak if they are not well-balanced.

Although muscles move the body and limbs and bones provide a system of levers, the primary source of your body's physical power is the natural shifting of weight, in other words: the balancing-mechanism. This mechanism coordinates all body parts as they move to perform physical activities.

The centre of your body resides in its heaviest part, your trunk. When balancing a lighter and heavier body part, the heavier part has more power than the lighter one. Your body anticipates movements of your arms. The centre of your body moves first, your arms follow.

When you use this power, your arms respond to a body impulse by moving in the opposite direction. If this process is interfered in any way, your muscles are forced to overwork which creates tension. When your balancing-mechanism is not restricted, your muscles perform efficiently and work enough to accomplish the desired motions. This creates no tension. To help me experience this natural balancing-mechanism I imagined throwing a ball.

Exercise 3: Throwing a ball
This exercise explores the natural sequence of body movements which occur when you throw a ball. Consider how this sequence of motions applies to cello playing.
Step 1. Pretend to throw a ball
Step 2. Notice the sequence and direction of your body movements; and
Step 3. Observe what happens to your feet, legs, hips, trunk, upper arms, forearms and hands.



(figure 7)[24]

Observations
When I pretended to throw a ball, I noticed a chain of actions. The centre of my body rotated and moved in the direction of the ball's destination as my arm went in the opposite direction. My centre then moved backward as my arm came forward. My body shifted and rotated around its centre through each phase of motion. I felt the power when my body lifted and rotated as I balanced from one foot to the other.

[23] V. Sazer (2003) – 'New directions in cello playing' *How to make cello playing easier and play without pain*.' (p. 41)
[24] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 44)

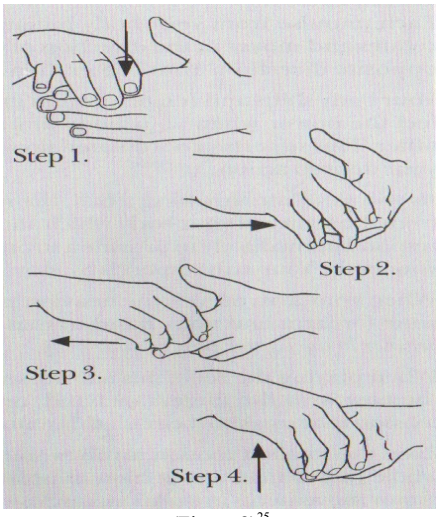
Sometimes when playing the cello, this natural sequence of motion can be interrupted. Pressing the bow with the fingers or hand, or pressing the fingers of the left hand creates tension that can disturb this natural flow.

Exercise 4: Press, Push, Lift and Pull
Your body reacts differently to different actions. Some create tension while others do not. This exercise showed me how my body reacts to pressing, pushing, lifting and pulling. I perform the breath test with each step. (See figure 8)
Step 1. Provide resistance with your left hand as you press lightly against it with a finger of your right hand. Try pressing harder
Step 2. Provide resistance with your left hand as you push it toward the left with your right arm
Step 3. Provide resistance with your left hand as you pull it toward the right with your right arm; and
Step 4. Provide resistance with your left hand as you lift it with your right arm.

Observations:
Even when I pressed very lightly, I felt tension appear in my arm. When I pressed harder I felt the tension extend all the way to my back. Pushing is similar to pressing, since it's the same action but than moving in a different direction.

Pressing and pushing while playing creates tension by causing opposing groups of muscles to contract at the same time. Pressing and pushing also compress the joints.

Lifting and pulling are similarly related. They have the opposite effect from pressing or pushing, however. They allow opposing muscle groups to contract and lengthen normally. Lifting and pulling also keep the joints open, minimize tension and reduce the danger of injury. Pressing and pushing create tension, but pulling and lifting do not.

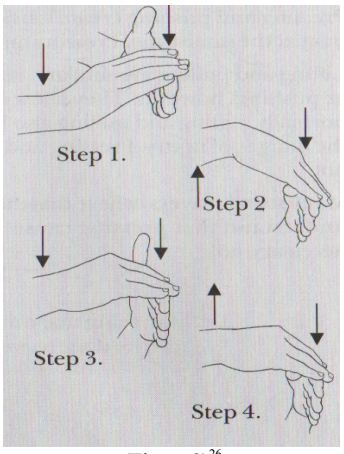


(Figure 8)[25]

Exercise 5: Leverage
This exercise explores leverage related to the hand, wrist and arm. Perform the breath test with each step. (See figure 9)
Step 1. Provide resistance with your left hand as you press down against it with your right hand allowing your wrist to drop
Step 2. Lift your arm to allow your wrist to rise, using leverage to apply downward force against your left hand
Step 3. As in the first step, press downward against your left hand, but without the extreme bend in your wrist; and
Step 4. As is the second step, again, use an upward impulse to bring your fingers downward against your left hand

Observations
When I lifted my wrist, my fingers went in the opposite direction. The stronger I lifted, the more force will go in the opposite direction. I think lifting to utilize leverage is the most efficient way use our bodies. It gives more power than either pressing or trying to apply arm of body weight to either fingering or bowing.

[25] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 46)

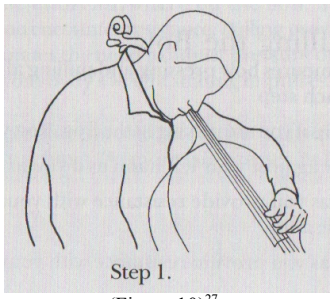


(Figure 9)[26]

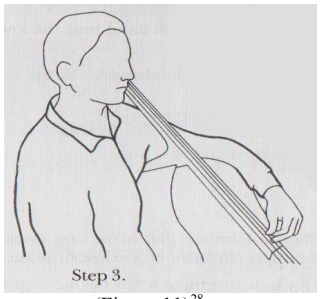
Exercise 6: Pressing and lifting at arm's length

This exercise explores the difference between pressing and lifting at arm's length and how they affect my body-alignment. For this exercise I need my cello. I'll perform the breath test with each step.

Step 1. Lean forward as you press a string down to play a note near the upper end of the fingerboard
Step 2. Sit upright and press the string down again in the same place
Step 3. Sit upright and play the same note. Use a gentle upward impulse.



(Figure 10)[27]



(Figure 11)[28]

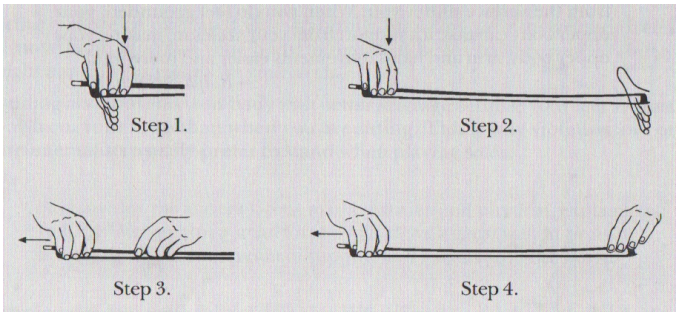
Observations

In general it is much more difficult to press when your left arm is extended than when it is bent. This is why many cellists lean forward, crouch or lean to one side when playing the cello. When I eliminated pressing with gentle lifting impulses, it became easier to play the cello.

Exercise 7: Pressing and pulling the bow

This exercise compares how pressing and pulling affect your bowing. Preform the breath test with each step.

Step 1. Hold your bow as if you are playing at the frog. Rest your bow on your left hand
Step 2. Press your bow against your left hand as if you are playing at the tip
Step 3. Pull your bow as you provide resistance with you left hand near the lower part of the bow; and
Step 4. Pull your bow as you provide resistance with your left hand at the tip



(Figure 12)[29]

[26] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 48)
[27] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.*' (p. 51)
[28] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.*' (p. 51)
[29] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 53)

Observations
I felt that more effort was required to apply pressure at the tip of the bow than at the frog. Pressure must gradually increase as I moved toward the upper part of the bow to sustain a tone.

If arm weight rather than pressing is used for tone production, the balance must be constantly readjusted to maintain the right amount of weight at each location on the bow.

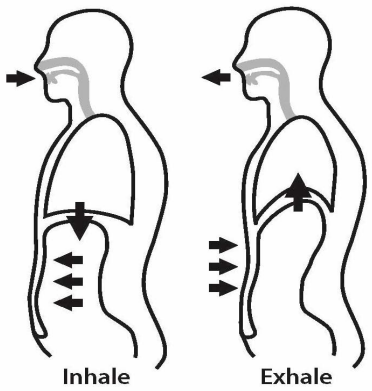
Pulling requires the same effort anywhere on the bow. Your bow arm feels the same regardless of where you encounter resistance. Pulling is your arm's natural response to your body's weight shifting impulses.

Breathing

I wanted to get a deeper insight into the subject of breathing correctly while playing. When you ask people to take a deep breath you will probably see them lifting their chests while doing so. It may look like they are taking a deep breath, but breathing this way is actually not so efficient.

Breathing Diaphragmatically
In order to create a deep, calm and complete way of breathing, we can use the *diaphragmatic* way of breathing, also known as "belly breathing". Breathing diaphragmatically also helps to reduce the stress responses before or during playing.

In short: your belly expends while breathing in, your belly contracts when breathing out. Babies breathe diaphragmatically but as we age we will learn to chest breath more and forget about diaphragmatic breathing unless we're voluntary willed to do so.[30] When we go to sleep at night, our bodies revert to diaphragmatic breathing too.[31]



(figure 13)[32]

The anatomy of breathing
The diaphragm is the main muscle of breathing that lies horizontally in the torso separating the lungs from the abdomen. It is higher in the front than in the back. Your lungs and heart are above and your abdominal viscera below the diaphragm. The diaphragm works automatically; it is triggered into action by a subconscious part of the brain that monitors the ratio of carbon dioxide to oxygen in your blood. When you need more oxygen, you take the next breath. You cannot directly feel or decide to move the diaphragm; you can feel some of the responses to the moving in other parts of the body, mostly your belly. The diaphragm flattens, drawing the lungs down, creating the space for the lungs to fill with air. It also helps the intercostal muscles to move the ribs up and out, creating the space by widening the rib cage. With this enlarging of the lungs, air moves in. Air moves in through the nose or mouth to even up the pressure inside and outside of your body. If you allow it, air will flow into you, with no extra effort.[33]

As mentioned breathing diaphragmatically is considered the most efficient way to breathe: Without the diaphragm contracting and opening up the lower half of the lungs, less space is available for incoming air. The

[30] http://www.simple-remedies.com/childrens-health/abdominal-breathing-in-infants.html
[31] http://www.bulletproofmusician.com
[32] https://peperperspective.com/tag/breathing/
[33] J. Kleinman and P. Buckoke (2013) – 'The Alexander Technique for Musicians,' London (p. 98)

lower half of the lungs is also by far the most efficient at delivering oxygen; the bottom 13 percent of the lungs brings in 60 ml oxygen per minute, while the top 7 percent only brings in 4 ml per minute. Chest breathing to the exclusion of diaphragmatic breathing (and that bottom 13 percent), then, is highly inefficient because it squanders added capacity and more effective tissue.[34]

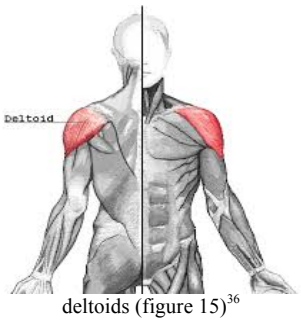
Demonstration 8: How to breathe diaphragmatically
The best way to experience breathing diaphragmatically is to lie down. But sitting comfortably in a chair or assuming a balanced stance is also appropriate.
Step 1. Place one hand on your chest, the other on your belly
Step 2. Take in a deep full breath through your nose, allowing the bottom part of your lungs to fill up with air. You'll find that your belly button area will have to push away from your spine to allow room for the bottom of your lungs to expand
Step 3. When breathing out through your mouth you will notice your belly contracting
Step 4. Try it a few more times to get more familiar with this way of breathing.

Breathing while playing
To enhance my breath control while playing the cello I performed the exercises mentioned below. The exercises and the background information are quoted from the book 'Cello Practice, Cello Performance' by Miranda Wilson.

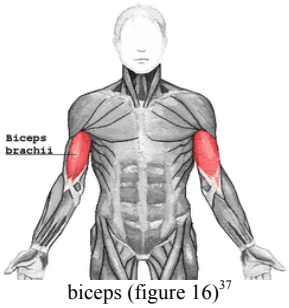
Guidelines for executing the exercises
Use a continuous vibrato for optimal tone-quality. Notice in exercises (a) and (b), in figure 17 below, how strongly we inadvertently associate the down-bow with the out-breath and the up-bow with the in-breath. Exercise (a) makes the traditional bowing-breathing association, but exercise (b) turns this assumption on its head. Notice the feeling of exhaling on an up-bow, which may be unfamiliar.

Exercises (c) and (d) remove the association of the changing bow and the changing breath. Notice how it feels to change breath in the middle of the bow, instead of at the frog or the tip. You can practice this exercise doing slow scales or single notes. You will hear an immediate improvement in your sound, because deliberate breathing had the pleasant by-product of relaxing the muscles cellists typically tense: trapezius, deltoids and biceps. This will enable the arm's weight to relax efficiently into the string.


trapezius (figure 14)[35]



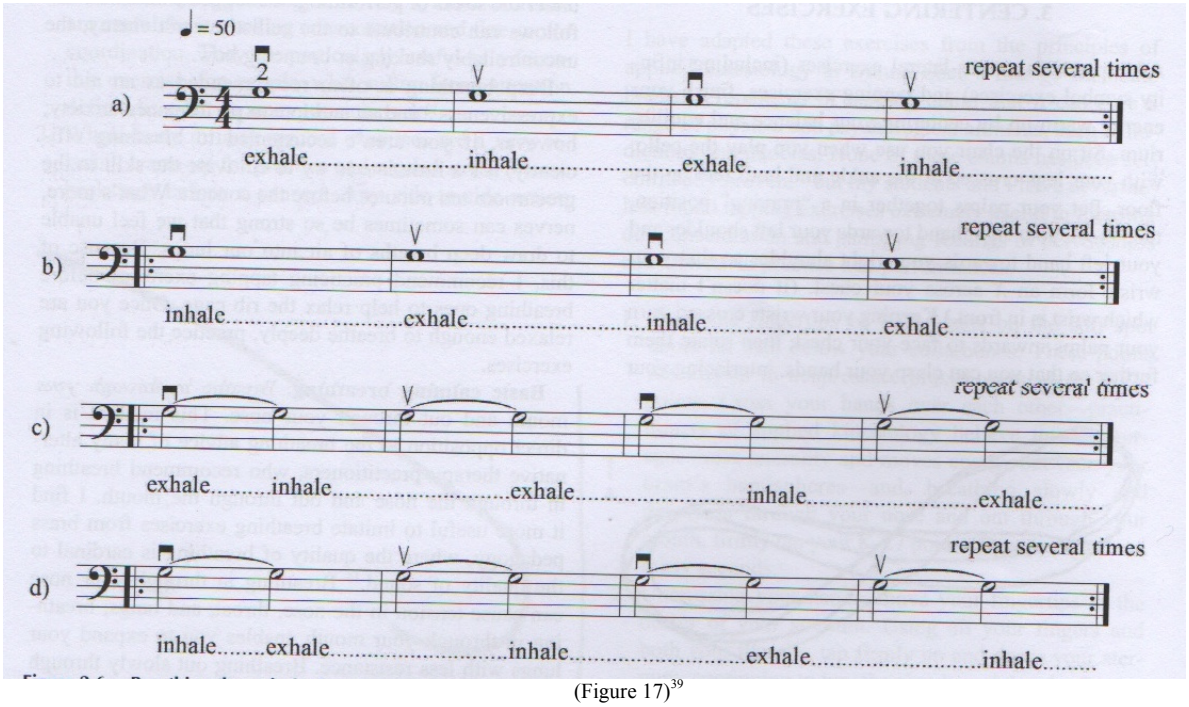
deltoids (figure 15)[36]



biceps (figure 16)[37]

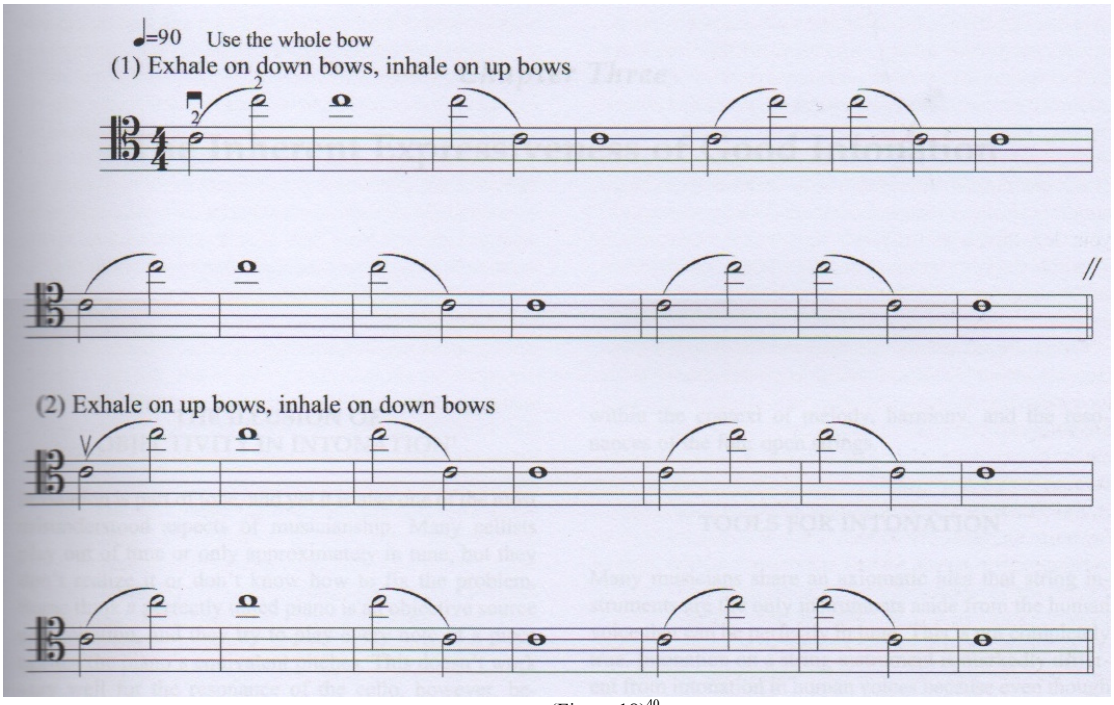
You may feel a little light-headed when you first practice this exercise. This is normal and simply means that you aren't used to breathing deeply. But practice it for a short time at first, and then gradually work up to longer periods as your breathing habits improve.[38]

[34] http://www.marksdailyapple.com/how-to-breathe-correctly/#axzz43MNezAnZ
[35] http://nicktumminello.com/2010/07/the-truth-about-the-trapezius-muscle-part-1-upper-and-mid-traps/
[36] https://en.wikipedia.org/wiki/Deltoid_muscle
[37] https://nl.wikipedia.org/wiki/Musculus_biceps_brachii
[38] M. Wilson (2015) – 'Cello practice, Cello Performance', London (p. 12)



(Figure 17)[39]

Next practice breathing "through" shifts, continuing to breathe in through the nose and out through the mouth. One of the main reasons cellists miss big shifts in performance – regardless of how well they went in the practice room – is the widespread tendency to hold the breath before executing a difficult technique, such as shifting. This causes the rest of the upper body to tense up and move inefficiently. The following exercise (see figure 18) is an experiment in the different combinations of down-bow vs. up-bow, shifting up vs. shifting down, and inhaling vs. exhaling. Use a healthy tone, whole bows, and a continuous vibrato as you practice it. Feel how the power of breathing helps both tone production and left-hand accuracy in shifts.



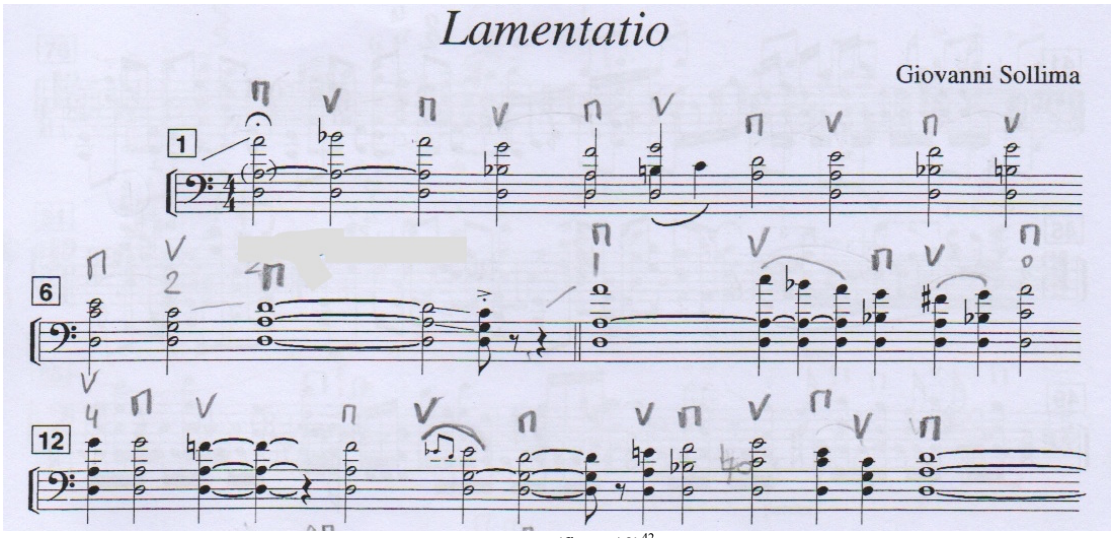
(Figure 18)[40]

[39] M. Wilson (2015) – 'Cello practice, Cello Performance', London (p. 12)
[40] M. Wilson (2015) – 'Cello practice, Cello Performance', London (p. 13)

Every time you practice, whether you're playing an exercise, a scale, an etude, or repertoire, start to pay conscious, deliberate attention to your breathing. Paying attention to breath while playing is a learned skill that takes a great deal of concentration, but after a while it will become natural and even easy.[41]

Experiment

I did a three-day experiment practicing the exercises which are mentioned above. Besides executing these exercises I tried to make the connection with the piece 'Lamentatio' by G. Sollima. I used the first part of the piece which is quite slow. I've played three different versions of the fragment by making rules when to inhale and when to exhale. In the first version, I tried to breathe out with every down bow and breathe in with every up bow. In the second version, I tried to breathe out while playing up bows and breathe in while playing down bow. In the last version I didn't think so much about breathing while up or down bows, but let it come naturally. This is a picture of the score including my bowings:



(figure19)[42]

During the experiment I recorded myself, analyzed the film material and wrote observations in my diary. This is an overview of my day-planning during the experiment:

Experiment	Day 1 Sep. 28th 2015	Day 2 Sep. 29th 2015	Day 3 Sep. 30th 2015
What did I do?	First I did the two exercises explained above (see fig. 17 and 18) Then I played the first version of the score of the piece 'Lamentatio' (fig. 19), by breathing out while playing down bows and breathing in while playing up bows.	Again I did the two exercises explained above (see fig. 17 and 18). It took some time to get used to the feeling. This is way I wanted to repeat it daily. Then I played the second version of the score of the piece 'Lamentatio'(fig. 19), by breathing in while playing down bows and breathing out while playing up bows.	I did the two exercises explained above (see fig. 17 and 18). At last I played the beginning of the piece 'Lamentatio'(fig. 19), but then I didn't think so much about breathing while up or down bows, but let it come naturally.

I wrote my observations in a diary which can be seen in Appendix 5 on page 55 as well as the memory stick tracks and the YouTube links to the recordings.

[41] M. Wilson (2015) – 'Cello practice, Cello Performance', London (pp. 11-13)
[42] Fragment of the piece 'Lamentatio' by G. Sollima

During the experiment I noticed that breathing out while playing a down bow and during shifts was extremely helpful. Especially the shifts we're much better executed because of the release of tension which naturally happens when exhaling. This is something which would be useful to incorporate into all kinds of repertoire.

Getting it into practice: Pre-playing Routine

Since I had already gained so much knowledge about breathing, sitting, placement of the feet, body-balance and sources of physical power I needed to find a way to incorporate all the elements into my playing. I was inspired by a method which is called 'centering' invented by Noa Kageyama, Ph.D and author of the method 'Bulletproof Musican' which helps musicians getting into the most optimal mental and physical state before playing.

Many top athletes use what sport psychologists call a pre-performance routine. If you watch basketball, football, baseball, tennis and example you'll see them. Musicians benefit from this sort of routine as well.

Based on the principles I've discussed, I have created the Pre-playing Routine to help me get in the right physical and mental state just before I start to play.

During playing I might find myself getting a bit out of balance or hold my breath during a difficult passage. I think it's okay to have these responses but I try to always come back to these basic elements which will help me reduce tension. I used this routine before a concert or audition but also before I started to practice.

Pre-playing routine
Step 1. Find a balanced way of sitting with your cello
Step 2. Place your feet on the ground in the way that you feel the stable, comfortable and grounded
Step 3. Take a couple of deep, calm breaths in the diaphragmatic way of breathing
Step 4. Do a quick body scan and search for any physical tension. Release any tension you find
Step 5. Hear the music in your head and play! Go for it!

Step 1. Making sure that you're sitting on a comfortable chair with the right seat height helps us to find a balanced way of sitting. Feel the contact you have with your sitting bones on the chair. Try to lengthen your spine by thinking upwards. Think of you head floating like a balloon above your spine.

Step 2. Place your feet on the ground in a way that you feel the stable, comfortable and grounded. Feel the contact you have with your feet on the ground. Feel your toes spreading out and taking as much surface as they need to feel stable. Keep your heels on the ground and place your feet a little in front of your knees.

Step 3. Take a couple of deep, calm breaths in the diaphragmatic way of breathing (see Appendix 1 page 38). Feel your belly expanding while you inhale and contracting when exhaling. Repeat this a few times. You may close your eyes if you wish.

Step 4. You must release any type of excessive muscle tension before we play. You can achieve this by doing a body-scan. You can start from your feet to your head or the other way around. Scan your toes, feet, legs, bottom, belly, back, arms, neck and your face. Try to release the tension. When you're able to breath deeply and completely you're tension-free.

5. Hear the music in your head. How does is sound or feel when you nail the opening? As soon as you can hear it or feel it you will be more engaged and ready to let loose and trust your body to do what you've trained it to do.

Measure level of tension
The first reason that I got in contact with Janine Stubbe, an expert from my network, was the possibility to measure the level of tension in my body while playing the piece 'Lamentatio'. Since she's the Leoctoraat in Health and Well-being at Codarts and a professor in body-movements at the university of Amsterdam we might have had the opportunity to be able to use the type of machinery which makes this possible. Unfortunately this wasn't possible. In order to have some sort of overview of the level of tension I feel when I play the piece 'Lamentatio', I've made a score with colors which indicate the level of tension. The score is to be seen in Appendix 6 on page 56. The first score indicates that the level of tension rose when I was playing fast repetitive notes for a long time. It reduced to the green level (indicating no excessive tension) during the pizzicato part in

the middle section of the piece. Then I again reached the red level, indicating a lot of excessive tension when the repetitive notes return before the very end of the piece.

Reflection and future plans

By the end of this intervention cycle I felt much more able to reduce muscle tension while playing the cello. The Pre-playing Routine had been a great contributor to this. While playing I could find myself getting a bit out of balance or shortly holding my breath during a difficult passage. After this cycle I was not so worried about this anymore since I was able to always come back to these basic elements which would help me reduce tension. In the next intervention cycle I planned a small study with other cellists to see if these elements could also work for them.

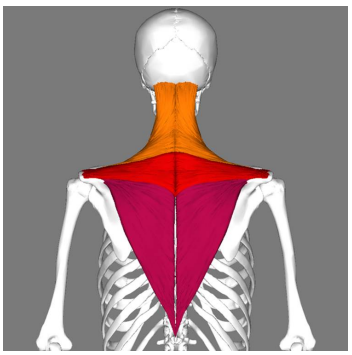
Third intervention cycle

Third reference recording
YouTube link: https://youtu.be/0skWm7f4hqY
Memory stick: track 3
Date: October 28th, 2015

Feedback

Feedback on the third reference recording
Luckily I was able to make an appointment with Christiaan van Hemert who helped me the first time as well to record the zero recording. We used two different cameras. One camera filmed me from the front, the other one filmed me from behind. I asked feedback from the experts in my network: Janine Stubbe, Jeroen den Herder and Doris Hochscheid.

Feedback from Janine Stubbe
"It's very nice to see your posture from the different angles on the recording. Your posture has improved a lot! Your shoulders are on the same height which creates less tension on the musculus trapezius. This muscle contains three different parts. You release tension on the two upper parts by not raising your shoulder (see orange and red part of the image). Your breath is also much more calm, very big improvement!"


(figure 20)[43]

Feedback Jeroen den Herder
"Again a lot of progress. Your body is balanced very well. It's interesting that you've recorded yourself from behind. I have the feeling that there is a curve in your back which is caused by the C-peg. It looks that your can't sit completely straight. Your right shoulder falls beautiful in its place, I don't notice any tension there. Very nice!"

Feedback Doris Hochscheid
"Your progress is amazing! Bravo for your hard work. I see you managed to integrate the directions from the Alexander Technique lessons we worked on the past months. I can see the upwards direction very well. Your sound is much more free. It's very nice that I able to see your back on this recording. Still, I see a little bit of a downward pull at the front. You squeeze your abdomens a little which makes your back not completely straight. You could try to release your front and in such way that the back lengthens and widens. But your neck and head are already so much more free!"

Own feedback on reference recording
I saw a lot of improvement in my playing while watching the third video. I like that I take time to look around, my neck is much more free. Due to the camera from behind I noticed that the C-peg is really not helping me with sitting straight. My head is forced to push forward because the peg is pinching in my neck. This is definitely something to work on this intervention cycle.

[43] Picture Janine Stubbe send me together with her feedback.

Methods and Analysis

Posture C-peg

As most people know, a cello has four big tuning pegs at the scroll of the instrument. The peg attached to the C string is closest to the neck of the player. It depends a lot on the body posture of the cellist, but I always had difficulties finding the right position, since the C-peg was always pinching in my neck (see third reference recording). As a reaction to this, I was forced to push my head forward. Since I wasn't able to sit completely straight I felt pain between my shoulder blades after practicing or playing a concert.

(Figure 21)[44]

Since I suffered from a back injury beginning of 2015, I learned to listen more carefully to the signals my body gave me. I took the pain seriously and searched for a solution. First I tried lengthening my end pin which positions the scroll of the cello much higher. I didn't feel very comfortable this way since I had the feeling that the cello was pushing me backwards. It immediately started to cause pain in my lower back. Then I decided to adjust my cello by installing a posture C-peg. I found a website[45] where I could purchase them from the U.S.A. My luthier in Breda helped me install the system on my cello.

The posture peg is much shorter than a normal C-peg. As you can see on the picture below, it leaves a lot of space at the side of the instrument where you can place your head. If you want to tune your cello you can plug in the external key.

(figure 22)

(figure 23)[46]

After having played for Alexander Technique expert Peter Buckoke during his masterclass in Codarts on March 2nd 2015, he suggested that I should consider installing a posture peg. He mentioned that the coordination would be better when the head is placed above the spine. "You will be more comfortable and you will be able to play from your heart in a way that you can't if you're dealing with muscular stress throughout your body. The nervous system communicates between the brain and the rest of the body through your spine. So you need your spine to be able to lengthen by placing your head above your spine. I think that cellists should really consider this, because you should not adapt you body to your instrument. What you should do is place your instrument in the right place where you can play." [47]

Searching on the Internet, I found other professional cellists who were also playing with posture pegs. I had the opportunity to interview two of them: Regina Mushabac[48] and Jakob Koranyi.[49] Regina Mashubac had been with posture pegs for fourteen years due to an elongated spine. She notes that the posture peg immediately helped her neck being pain free. Some of her students are also playing with posture pegs and she can recommend it to other cellists, especially the tall ones. Jakob Koranyi didn't install the posture peg due to an injury, but just because it was more comfortable for him. The complete interviews can be found in Appendix 4 on page 53.

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[44] https://www.caswells-strings.co.uk/product/cello-posture-tuning-peg/
[45] http://www.lindawest.com/posture_peg_p/postrpeg.htm
[46] Pictures from my own cello
[47] Masterclass Peter Buckoke March 2nd 2015, (see audio file on memory stick: track 6)
[48] http://reginamushabac.com
[49] http://www.jakobkoranyi.com

The first moment I played with the posture peg felt really strange. I had difficulties orientating on my cello. I discovered that the C-peg in my neck was actually an orientation point I used for placing my left hand on the string. But I immediately felt very free, I was able to straighten my spine and my head finally felt as if it were in its right place. It took me a few days to adjust to the feeling, however, now when I play on a cello which doesn't have the posture peg, I feel like in a kind of prison: trapped and unable to move freely and fully express myself.

Quasi Experiment Zutphen

As I mentioned I discovered four basic elements which helped me reduce muscle tension:

- Breathing
- Gravity, Balance and Body-use
- Sitting and Placement of the Feet
- Sources of Physical Power

Although these elements worked for me, it doesn't mean they will work for everyone. In order to test this, I conducted a quasi group experiment with eight other cellists who were currently studying at Codarts. Every six weeks my main subject teacher Jeroen den Herder organized a cello-week in Zutphen which gave us the opportunity to have cello lessons every day, study and perform on a concert by the end of the week.

For four days I worked with the cellist in smaller groups teaching them the basic principles followed by a group workshop explaining the Pre-playing Routine.[50] All the workshops are recorded. The video material is partly to be seen on the memory stick as tracks 26-31. Due to very large files I wasn't able to upload the full workshops on the stick. I did manage to upload them on YouTube. The video links can be found in the overview of the workshop in the following section. I created several questionnaires to get deeper insight into the experiences of all the cellists. The complete questionnaires are to be found in Appendix 8 on page 65.

This is an overview of the planning of the workshop:

	Day 1: 26th of January	**Day 2:** 27th of January	**Day 3:** 28th of January	**Day 1:** 29th of January
What did I do?	On the first day I worked with Alberto and Atakan. First they filled in a questionnaire about their experience with tension during playing in general. I asked them to play an excerpt which caused them a lot of physical tension. Then I explained the four basic elements: -Way of sitting -Gravity, Balance and Body-use - Sitting and Placement of the Feet - Sources of Physical Power. By the end of the workshop they played their excerpt again and tried to incorporate these elements into	On the second day I worked with Virginia, Jose and Silvia. First they filled in a questionnaire about their experience with tension during playing in general. I asked them to play an excerpt which caused them a lot of physical tension. Then I explained the four basic elements: -Way of sitting -Gravity, Balance and Body-use - Sitting and Placement of the Feet - Sources of Physical Power. By the end of the workshop they played their excerpt again and tried to incorporate these elements into	On the third day I worked with Sebastiaan, Pedro and Violetta. First they filled in a questionnaire about their experience with tension during playing in general. I asked them to play an excerpt which caused them a lot of physical tension. Then I explained the four basic elements: -Way of sitting -Gravity, Balance and Body-use - Sitting and Placement of the Feet - Sources of Physical Power. By the end of the workshop they played their excerpt again and tried to incorporate these elements into their	I did a group workshop with all the cellists including Jeroen den Herder. I explained the Pre-playing Routine and randomly selected some cellists to try it before playing the beginning of a piece their own choice.

[50] I explain the Pre-playing Routine on page 7.

	their playing.	their playing.	playing.	
YouTube Video links	**Part 1:** https://youtu.be/6USdHLgZzDE **Part 2:** https://youtu.be/raKhe5B_tbA	**Part 1:** https://youtu.be/OeMdcdIuOys **Part 2:** https://youtu.be/0hUQnoGpxC0	**Part 1:** https://youtu.be/i63DHOAAQpQ **Part 2:** https://youtu.be/8tVf-wnaQLA	https://youtu.be/bsgasBn-u1c

How did it go?
I had a lot of fun working with my fellow students. The atmosphere was great, everybody was open minded and very much into the workshop. I did a lot of preparation work before the workshop. Maybe a little too much, because during the first workshop I noticed that I had too much text while explaining the principles. The more words I used the less understandable it seemed for the participants. After the first workshop I decided not to use the text, but just explain what I knew from memory. The next day I felt much more comfortable and I felt that I had a better connection with the participants. By getting use to the feeling of standing in front of a group and to teach, I learned a lot. The third and the fourth days were already better than the previous ones. I learned to formulate all the knowledge I have in my head about the subject into understandable language for others who are not so much into the subject yet.

Results
Number of participants: 8
Average age: 24,13 years
Gender: 5 Male, 3 Female
Average years of playing the cello: 16 years

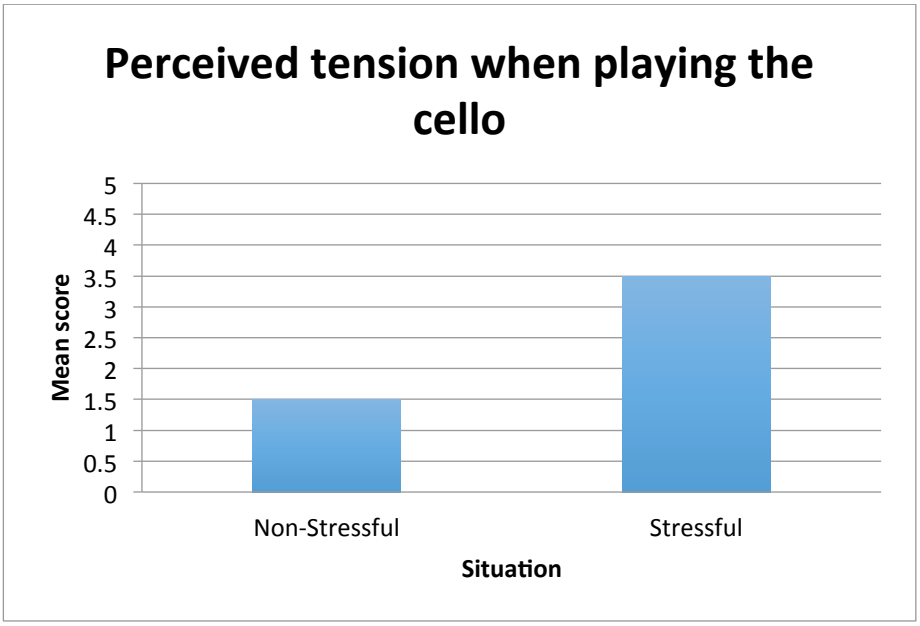
Results of pre-workshop questionnaire
Before the workshop I asked the participants to fill in a questionnaire about their experience with tension in general. Did they experience a lot of tension while playing? In what kind of situations? With what type of repertoire? Did they suffer from injuries? What did they do to prevent it? Etc. Some results:

Q: *My physical tension while playing the cello in a non-stressful situation (e.g., at home)*

A: Average score = 1,5/5 (0 = no tension, to 5 = a lot of tension) (See graph below).

Q: *My physical tension while playing the cello in a stressful situation (e.g., audition)*

A: Average score = 3,5/5 (0 = no tension, to 5 = a lot of tension) (See graph below).



Perceived tension when playing cello in stressful and non-stressful situations

The graph above suggests that stressful situations like an audition can contribute to the level of perceived tension which is present in the body when playing the cello. It also shows that even in a non-stressful situation, there is still a low level of tension that is perceived. It may be that this low-level tension is related to the 'functional tension' I mentioned on page 4 of this report.

Q: *Do you feel more physical tension with certain repertoire in comparison with other repertoire?*

It was striking to see that half of the cellists experienced a lot of physical tension when playing Russian repertoire, especially Shostakovich. Indeed, the character of this music is often quite powerful, which can lead to extra physical tension.

Q: *Are you suffering from any injury right now or did you have an injury in the past?*

5 out of 8 cellists suffered from an injury. Injuries included tendinitis (3/8) and sport-related injuries (2/8). This confirmed my belief that there is need for training and awareness of coping with pain and injury.

Q: *Have you tried reducing physical tension in your playing?*

Only one participant had employed a recognized method, Alexander Technique. He also reported that he did not experience any pain or injury. The other participants had tried a variety of things such as working slowly on passages, being aware of the breathing while playing etc., but here was neither a recognized nor consistent method used by 7/8 participants. From this I conclude that young highly skilled cellists do not use a consistent method of gaining body awareness and relaxation/release of tension. It also implies that a lack of physical awareness and relaxation methods can lead to pain and injury.

Most of the cellists who suffered from an injury had to stop playing for a while since the cause of the injury was excessive playing. Such injuries and pain can stop young cellists from playing at a time when improving skills and increasing repertoire is vital. It's possible that the level of competition at the conservatory could lead young instrumentalists to push themselves beyond their mental and physical capabilities.

Q: *Did you find a remedy for this injury?*

The answers varied from rest, medication, working with physiotherapists, physical activity and even operation. While these interventions resulted in positive outcomes, it is my belief that the prevention of injury with physical awareness is preferable to treatment after the injury has occurred.

Blind Judges Test
In order to test if there was an improvement in the playing of the participants after the workshop I created a blind-judge experiment. The two blind judges were my Alexander Technique teacher/cellist Doris Hochscheid and my main subject teacher Jeroen den Herder. They analyzed short movie excerpts from cellists not knowing if the excerpt was filmed before or after the workshop. They judged the videos based on criteria such as sound production, quality of intonation, body posture, freedom of movements and relaxation of the muscles. The complete questionnaire and answers are to be found in Appendix 9 and 10 (page 69-74), just as the memory stick tracks and YouTube links to the videos.

The judges consistently assessed the given criteria as better on the *after*-workshop videos. Jeroen den Herder said: *"What I've noticed on the video's after the workshop is that all the cellists we already unified with body and cello before the playing. You can see on the videos before the workshop that the cellists are trying to give directions from the head. And it stays there, there's no connection between mind and body. There's no trust in believing the body is capable of executing the physical actions which are needed. They do not let the muscle and body memory do its job. That's why I wrote after watching Alberto's video that there is a unity in video A, like a horse and its rider. Everything falls on its place. In the other video you can see that the body and the brain are separated."*

Feedback Participants
Regarding participant feedback, I received extremely positive responses overall. They all indicated that they want to incorporate the elements of the workshop into their daily practice and playing. Some quotes about the group workshops include:

'I found the work and research that she did very interesting and it was a really nice experience, very useful!'

'In my opinion, the ideas in the workshop where very interesting (even when it was not new for me, it is always nice to remember this kind of things), but I think that the dynamic would have been more fluent trying not to write dawn our own experience all the time.'

While it's great to get good feedback, I have to say this comment was most helpful: I agree that having questionnaires after every exercise hindered the dynamic and the fluidity of the workshop. Of course these were for research purposes only and in the future I will not include them unless I am looking for further information in order to refine my ideas.

Some quotes about the Pre-playing Routine:

'Very helpful, and everybody should do it. When we are playing in a concert, our heart is more stressed than a normal situation and actually we don't realize we need enough time to think about what are we going to do with a "cold-mind".'

'I think that the routine is very important for every musician in order to be totally prepared before starting to practice or playing a concert and we should take it more seriously.'

'It was very useful. Thinking about my breathing before I start, helps me a lot to improve my bow technique. I felt much more relaxed.'

Final Recording

Final reference recording
YouTube link: https://youtu.be/fkUszC2M03w
Memory stick: track 4
Date: April 24th, 2016

Own feedback
I wasn't able to make an appointment with Christiaan van Hemert who helped me to record the first and the third reference recording. I've therefore made the recording at home with my iPhone, so unfortunately it doesn't show multiple angles.

When I compare the zero recording with the final reference recording I see a different cellist. When I see myself playing on the zero recording, I see a cellist struggling a lot with physical tension. She's trying to survive and finish the piece even as she's fighting her pain. However, in the second recording, I see a cellist who is capable of making musical decisions without interference from a tensed body. My body is now able to execute the physical movements that I need it to do. Due to the posture peg I'm able to sit completely straight behind my instrument which feels great. Still, I experience physical tension while playing the cello. But I think this is completely normal and even necessary. Now I can trust my ability to relax whenever I want to. For me this is the freedom I wished for at the beginning of my master study.

Feedback Jeroen den Herder
"It is wonderful to see your progression over the last two years. Our plan for this master study was to release the excessive tension in your shoulders and be more free in your motions. You've succeeded, and I'm very proud of you! You will benefit from this research process for the rest of your professional career and I think you are an inspiration for other cellists who are struggling with excessive physical tension while playing. Good job!"

Measure Level of Tension
In order to compare the level of tension I experienced when I play the piece 'Lamentatio', I've made a new score with colours which indicate the level of tension. The score can be seen in Appendix 7 page 60. The levels of tension which are present while playing the piece are much lower than before. Fortunately I do not even reach the highest red level anymore which indicated a lot of physical tension.

Appendices

Network

Cellists:
- Jeroen den Herder
- Job ter Haar
- Giovanni Sollima
- Regina Mushabac
- Doris Hochscheid
- Jakob Koranyi

Expert in body movement:
- Janine Stubbe

Alexander Technique teachers:
- Doris Hochscheid
- Peter Buckoke

Workshop Participants:
- Alberto Zente
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Reference List

Literature:

- Flesch, C. - The art of Violin Playing, Carl Fischer, Inc, New York, 1924
- Kleinman, J. and Buckoke, P. – The Alexander Technique for musicians, London 2013
- Mackie, V. – Just play naturally, London 2000
- Richter, S. - The enigma, NVC Arts, U.S.A. 1998
- Sazer, V. – 'New directions in cello playing' *How to make cello playing easier and play without pain*, Los Angelos 2003
- Szende, O. and Nemessuri, M. - The physiology of Violin Playing, London 1971
- Wilson, M. – Cello practice, cello performance, London 2015

Websites:

- **Online method: N. Kageyama – The bulletproof musican** http://www.bulletproofmusician.com
- **Posture peg:** https://www.caswells-strings.co.uk/product/cello-posture-tuning-peg/
- http://cellofun.yuku.com/reply/99928/Posture-Pegs#.VuxSwzY3rgI
- http://cellofun.yuku.com/reply/99928/Posture-Pegs#.VuxSwzY3rgI
- **Sitting:** http://www.forrmobility.co.uk/Products/DailyLivingAids/BedChair.html
- **Julian Lloyd Webber injury:** http://www.gazette-news.co.uk/news/local/clacton/11823929.Country_s_most_famous_cellist___forced_to_retire_by_neck_injury___brings_once_in_a_lifetime_musical_tour_to_Clacton/
- **Jakob Koranyi:** http://www.jakobkoranyi.com
- **Breathing:** http://www.marksdailyapple.com/how-to-breathe-correctly/#axzz43MNezAnZ
- **Dry-Needle Therapy:** http://www.moveforwardpt.com/resources/detail/dry-needling-by-physical-therapist-what-you-should

- **Muscles:** http://nicktumminello.com/2010/07/the-truth-about-the-trapezius-muscle-part-1-upper-and-mid-traps/
- **Breathing:** https://peperperspective.com/tag/breathing/
- **Regina Mushabac**: http://reginamushabac.com
- **Sietse-Jan Weijenberg:** http://www.sietsejanweijenberg.nl
- **Breathing:** http://www.simple-remedies.com/childrens-health/abdominal-breathing-in-infants.html
- **Feldenkrais:** http://www.somatic.com/articles.html
- **Tension:** http://www.thestrad.com/cpt-latests/10-ways-to-avoid-tension-in-your-playing/
- http://www.thestrad.com/cpt-latests/how-tai-chi-can-help-cellists/
- http://www.thestrad.com/cpt-latests/why-injury-prevention-is-so-important/
- **Muscles:** https://en.wikipedia.org/wiki/Deltoid_muscle
- https://nl.wikipedia.org/wiki/Musculus_biceps_brachii

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Appendix 1: Method

Demonstrations: Introduction
The best way to become better acquainted with our body and increase our understanding of how it works, is to observe how it feels when we perform particular actions. From this point forward, demonstrations are used to enable us to physically experience the elements presented. These demonstrations will help us identify sources of physical tension and discover tension-free methods of playing. Some demonstrations are performed with the cello and some without. This will help us to explore basic principles of body movement with and without the instrument.

It is advisable to perform these demonstrations as experiments in your own process of self-discovery. Increasing awareness of how you use your body can free you from unwanted tension.

Demonstration 1: Balanced stance
Several of the demonstrations ask you to assume a balanced stance. You can find this body alignment in the following way:

Step 1. Stand tall with your feet shoulder-width apart
Step 2. Let the crown of your head face the ceiling and expand your lungs
Step 3. Have your shoulders directly over your hips
Step 4. Bend you knees slightly – just enough to make sure that they are not locked
Step 5. Balance your weight on the balls and heels of each foot

Do not rest on the outer edges of your feet. This rotates your hips to a position that weakens your back support, whether you are standing or sitting. Turn your feet towards your little toes to test the difference.

Breathing

'Breath is the life; and breathing capacity is the measure of life.'
F.M. Alexander[51]

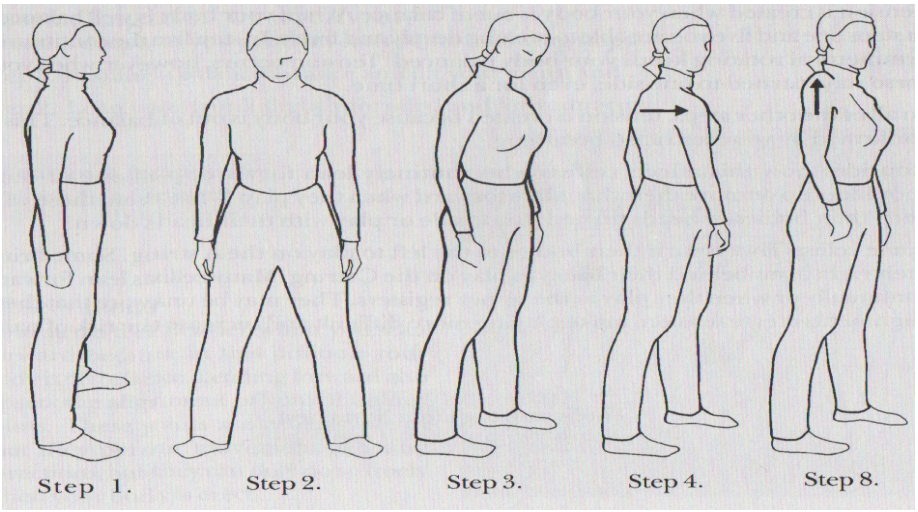
What I've noticed is that we as string players are rather poorly educated in the habit of breathing correctly while playing. To me there is simple logic in this fact, and it's due to the principal that our breath is not directly related to the sound-production on our instruments. As mentioned before my breath is sometimes restricted during my performance and at times I even hold my breath while playing! The possible outcome of not breathing is obvious: we cannot expect anything in our bodies to work well. Without enough oxygen we cannot think straight, our muscles lose strength and accuracy in movement, and there can be a build up of lactic acid.

Breathing correctly while playing is not only very important for our bodies to function well. It's also a very effective diagnostic tool in order to identify areas of tension in our bodies: When our bodies are completely well-balanced, we are tension-free and able to breathe deeply and completely. In this state our bodies are at their peak of efficiency. When tension is present somewhere in our body, our breath is immediately restricted. An exercise which helped me identify the sources of tension is *The Breath Test***.** The Breath Test is an important diagnostic tool. It is a simple and effective way to tell if our bodies are tension-free or not.

Exercise 2: The Breath Test
Breathe deeply as you perform each of the following steps.
Step 1. Assume a balanced stance
Step 2. Lean your head forward
Step 3. Lean your head to one side
Step 4. Turn your torso a few degree to one side
Step 5. Rotate your torso gently from side to side with even, continuous motions
Step 6. Lean your torso slightly forward
Step 7. Hold your elbow a bit behind your back
Step 8. Lift one or both of your shoulders
Step 9. Pull one or both of your shoulders forward
Step 10. Bend your wrist downward

[51] J. Kleinman and P. Buckoke (2013) – 'The Alexander Technique for Musicians', London 2013 (p. 91)

Step 11. Experiment with other body positions.



(Figure 1)[52]

Observations

Some questions you can ask yourself are:
- Is your breath restricted in some positions?
- Can you breath more freely in some positions than in others?

What you may notice is that tension is created when our body is out of balance. When your body is well balanced in steps one and five you are able to breathe deeply and freely. In step five the continuous symmetrical rotating keeps your body balanced. Tension occurs, however when your torso stays turned to one side, even for a short moment. In all the other steps, tension in created because your body is out of balance. This is confirmed by your restricted breathing.

Consider how this affects cellists who learn forward, pull one or both shoulders up or move their shoulders forward when they play. What about those who keep their bodies or heads turned to one side or play with their heads down?

Some cellists always turn their bodies to the left to play of the A string. Some bring their right arms behind their backs to play of the C string. Many cellists lean forward continually or when they play in the upper registers. They may be unaware that these alignments create tension, make playing more difficult and increase the risk of pain.

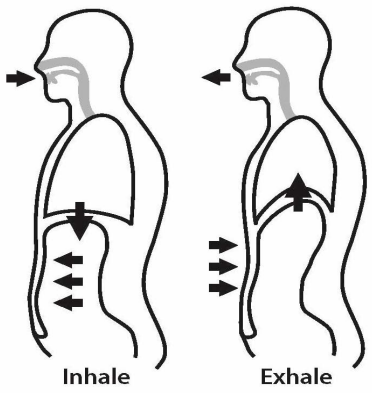
Diaphragmatic Breathing

When you ask people to take a deep breath you will probably see them lifting their chests while doing so. It may look like they are taking a deep breath, but breathing this way is actually not so efficient.

In order to create a deep, calm and complete way of breathing, we can use the *diaphragmatic* way of breathing, also known as belly breathing. Breathing diaphragmatically also helps to reduce the stress responses before or during playing.

In short: your belly expends while breathing in, your belly contracts when breathing out. Babies breathe diaphragmatically but as we age we will learn to chest breath more and forget about diaphragmatic breathing unless we're voluntary willed to do so.[53] When we go to sleep at night, our bodies revert to diaphragmatic breathing too.[54]

[52] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 25)
[53] http://www.simple-remedies.com/childrens-health/abdominal-breathing-in-infants.html
[54] http://www.bulletproofmusician.com



(Figure 13)[55]

The anatomy of breathing

The diaphragm is the main muscle of breathing that lies horizontally in the torso separating the lungs from the abdomen. It is higher in the front than in the back. Your lungs and heart are above and your abdominal viscera below the diaphragm. The diaphragm works automatically; it is triggered into action by a subconscious part of the brain that monitors the ratio of carbon dioxide to oxygen in your blood. When you need more oxygen, you take the next breath. You cannot directly feel or decide to move the diaphragm; you can feel some of the responses to the moving in other parts of the body, mostly your belly. The diaphragm flattens, drawing the lungs down, creating the space for the lungs to fill with air. It also helps the intercostal muscles to move the ribs up and out, creating the space by widening the rib cage. With this enlarging of the lungs, air moves in. Air moves in through the nose or mouth to even up the pressure inside and outside of your body. If you allow it, air will flow into you, with no extra effort.[56]

As mentioned breathing diaphragmatically is considered the most efficient way to breathe: Without the diaphragm contracting and opening up the lower half of the lungs, less space is available for incoming air. The lower half of the lungs is also by far the most efficient at delivering oxygen; the bottom 13 percent of the lungs brings in 60 ml O2 per minute, while the top 7 percent only brings in 4 ml per minute. Chest breathing to the exclusion of diaphragmatic breathing (and that bottom 13 percent), then, is highly inefficient because it squanders added capacity and more effective tissue.[57]

Demonstration 8: How to breathe diaphragmatically

The best way to experience breathing diaphragmatically is to lie down. But sitting comfortably in a chair or assuming a balanced stance is also appropriate.
Step 1. Place one hand on your chest, the other on your belly
Step 2. Take in a deep full breath through your nose, allowing the bottom part of your lungs to fill up with air. You'll find that your belly button area will have to push away from your spine to allow room for the bottom of your lungs to expand
Step 3. When breathing out through your mouth you will notice your belly contracting
Step 4. Try it a few more times to get more familiar with this way of breathing.

Breathing while playing

To be able to improve your breathing while playing you can perform the exercises that are mentioned below.

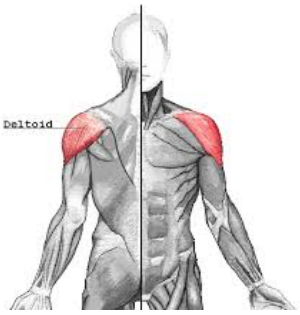
Guidelines for executing the exercises

Use a continuous vibrato for optimal tone-quality. Notice in exercises (a) and (b), in figure 6 below, how strongly we inadvertently associate the down-bow with the out-breath and the up-bow with the in-breath. Exercise (a) makes the traditional bowing-breathing association, but exercise (b) turns this assumption on its head. Notice the feeling of exhaling on an up-bow, which may be unfamiliar.

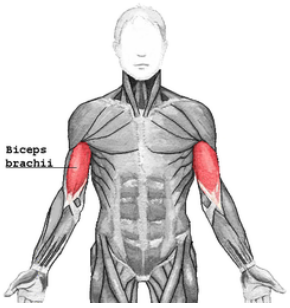
Exercises (c) and (d) remove the association of the changing bow and the changing breath. Notice how it feels to change breath in the middle of the bow, instead of at the frog or the tip. You can practice this exercise doing slow scales or single notes. You will hear an immediate improvement in your sound, because deliberate breathing had the pleasant by-product of relaxing the muscles cellists typically tense: trapezius, deltoids and biceps. This will enable the arm's weight to relax efficiently into the string.

[55] https://peperperspective.com/tag/breathing/
[56] J. Kleinman and P. Buckoke (2013) – 'The Alexander Technique for Musicians,' London (p. 98)
[57] http://www.marksdailyapple.com/how-to-breathe-correctly/#axzz43MNezAnZ

trapezius
(Figure 3)[58]

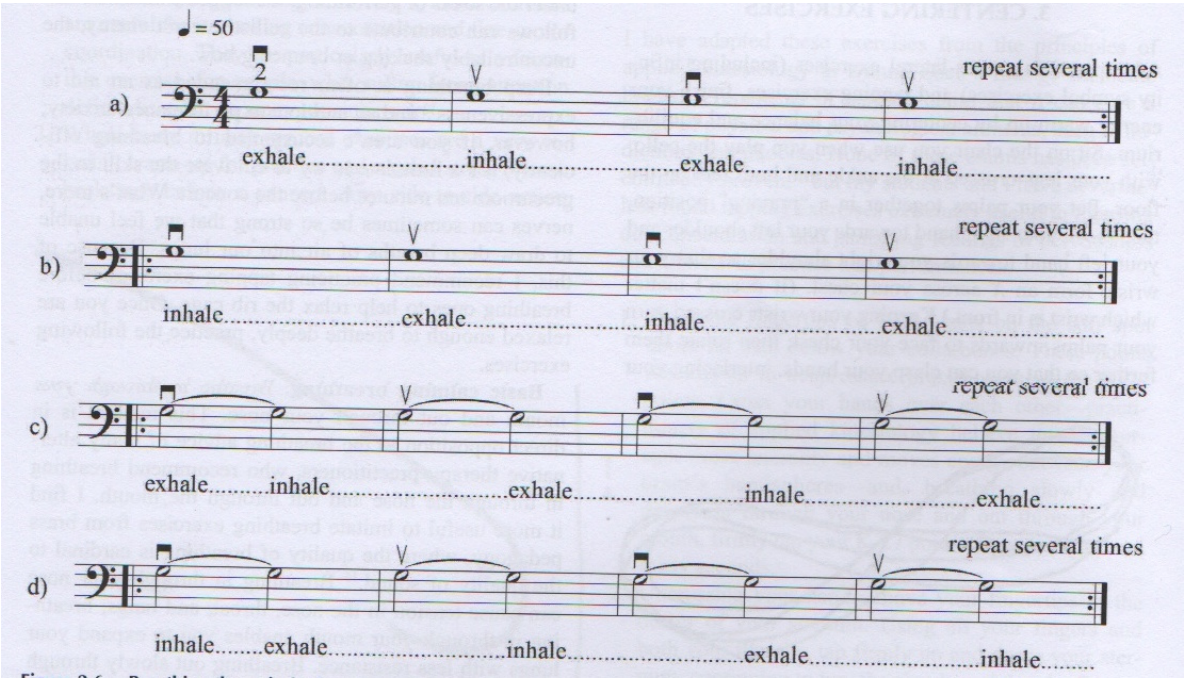


deltoids
(Figure 4)[59]



biceps
(Figure 5)[60]

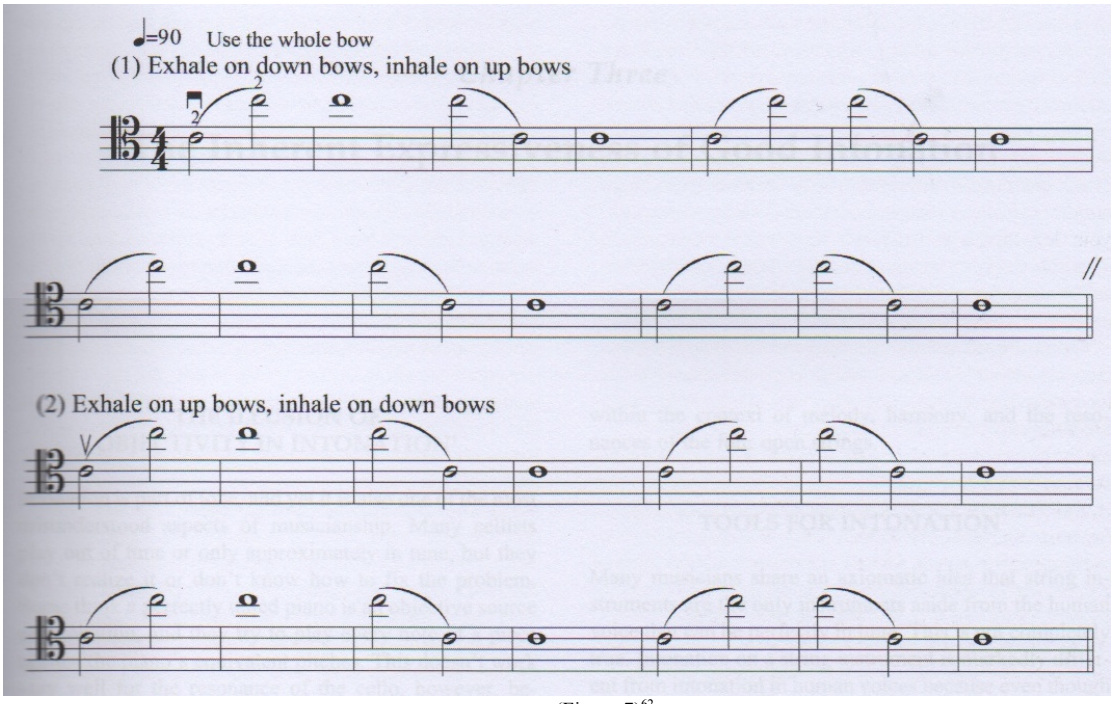
You may feel a little light-headed when you first practice this exercise. This is normal and simply means that you aren't used to breathing deeply. But practice it for a short time at first, and then gradually work up to longer periods as your breathing habits improve.



(Figure 6)[61]

Next practice breathing "through" shifts, continuing to breathe in through the nose and out through the mouth. One of the main reasons cellists miss big shifts in performance – regardless of how well they went in the practice room – is the widespread tendency to hold the breath before executing a difficult technique, such as shifting. This causes the rest of the upper body to tense up and move inefficiently. The following exercise (see figure 7) is an experiment in the different combinations of down-bow vs. up-bow, shifting up vs. shifting down, and inhaling vs. exhaling. Use a healthy tone, whole bows, and a continuous vibrato as you practice it. Feel how the power of breathing helps both tone production and left-hand accuracy in shifts.

[58] http://nicktumminello.com/2010/07/the-truth-about-the-trapezius-muscle-part-1-upper-and-mid-traps/
[59] https://en.wikipedia.org/wiki/Deltoid_muscle
[60] https://nl.wikipedia.org/wiki/Musculus_biceps_brachii
[61] M. Wilson (2015) – Cello practice, cello performance, London (p. 12)



(Figure 7)[62]

Every time you practice, whether you're playing an exercise, a scale, an etude, or repertoire, start to pay conscious, deliberate attention to your breathing. Paying attention to breath while playing is a learned skill that takes a great deal of concentration, but after a while it will become natural and even easy.[63]

Gravity, Balance and Body-use

"In the living body not even sleep can bring the center of gravity to a perfect standstill, and moving about will make it swing considerably" – Otto Szende and Mihaly Nemesurri[64]

Gravity is a constant downward force. It pulls your head down towards your neck and your trunk down towards your hips. It also compresses your spine and if not resisted makes your body sag. You can cope with gravity by either actively lifting your body or passively submitting to it.

If you would submit completely, of course, you would be lying on the floor. Just being alive requires lifting. When your body is lifted and well balanced, your spine and joints expand and you are able to breathe without restriction. With this body alignment, gravity can become an asset rather than a liability.

What we mean by *balance* is an efficient use of the body in relation to gravity. Many people misunderstand this approach as 'relaxation'. Although total relaxation may be appropriate for resting or meditation, it is hardly the condition to be in when we are playing our instrument. Because this relaxation can lead to a static heaviness and downward pull. Balancing is completely different from being static. To play, you must be free of tension, but also alert, balanced and ready for action.

The human body seeks balance and is always in motion. Its centre of gravity is constantly shifting in a series of continuous counter-balancing reactions. The body is like a flexible combination of several scales. Allowing this balancing process to function freely is key to playing the cello more easily and avoiding tension. Anything that interferes with your total body-balance creates tension and the potential for pain.

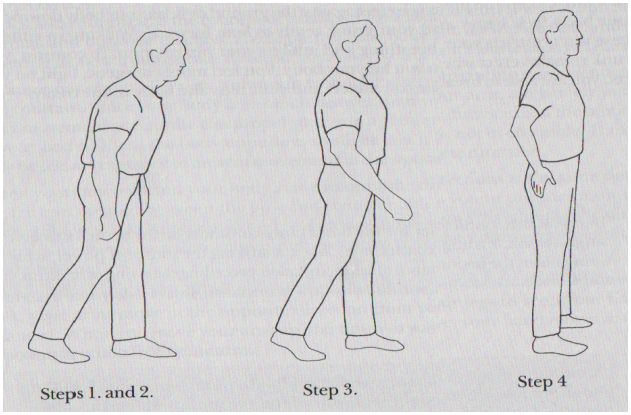
[62] M. Wilson (2015) – Cello practice, cello performance, London (p. 13)
[63] M. Wilson (2015) – Cello practice, cello performance, London (p. 11-13)
[64] O. Szende and M. Nemessuri (1971) - The physiology of Violin Playing, London

Most cellists use their bodies in one of these three ways when playing:

- They either apply downward pressure.
- They release body weight downward.
- They lift their bodies.

Although many cellists combine these approaches, it is useful to explore the characteristics of each.
The next exercise illustrates three ways of using our bodies. The distinctions are observable in all activities, including walking and cello playing.

Exercise 4: Three ways of walking
Perform the breath test with each step.
Step. 1 Walk, pressing your feet downward against the ground
Step 2. Walk, relaxing your body weight downward
Step 3. Walk, maintaining a balanced stance. Focus on lifting your body. Be sure that your pivot from the heel to the ball of each foot
Step 4. Repeat the first three steps, holding your hands on your hips.



(figure 8)[65]

Observations
Some questions you can ask yourself are:
- Which way of walking gave you the greatest feeling of strength, buoyancy and well-being?
- Which way allows your hips to rotate freely?
- Which way allows you to breathe most freely?

You may have noticed that when you press your feet against the ground or relax your body downward, your body feels heavy and your trunk tends to lean forward. Walking in either of these ways restricts your breathing and inhibits your hip rotation. In contrast, your trunk remains straight when you lift your body. You feel more energetic, light on your feet, you are able to breathe completely and your hips and body rotate freely.

Opposites
Opposites are implicit to the concept of balance. Physics teaches that every action has an equal and opposite reaction. If one part of your body moves without a counter-balancing motion in the opposite direction, your body is off balance and tension is created.

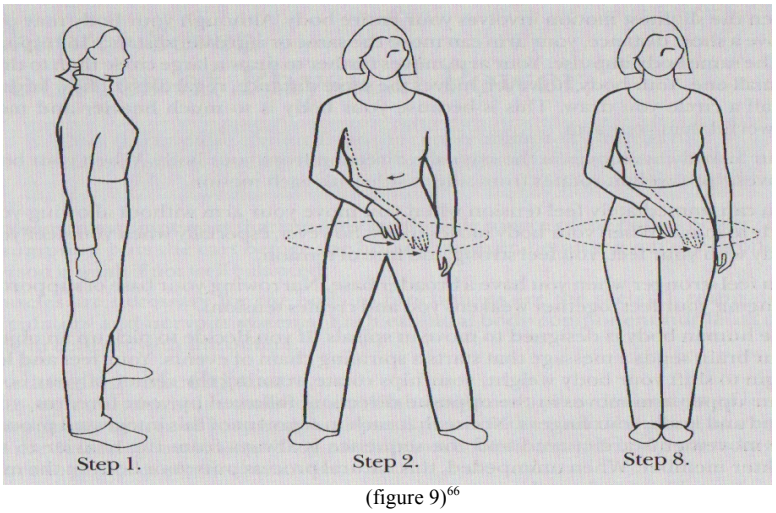
Because your centre of gravity is always in motion, counter-balancing movements are also constant. Since your body is so much heavier than your arm, a relatively small body movement or impulse can propel your arm a greater distance than the motion of your body. Often the body impulse is so light that it is not even visible. It may only be felt as resistance to an arm movement in the opposite direction.

When your bow arm and your body move in opposite directions at the same time, the friction created between the bow and string enables you to produce a sound easily. If however, your bow arm and body move in the same direction at the same time, this friction is partially or completely neutralized. It then takes greater effort to produce sound.

[65] V. Sazer (2013) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 35)

There are many examples of opposites balancing one another. When you walk, your arms move in the opposite direction from your legs to keep your body balanced. When you move your arm up and down to wave, your hand moves in the opposite direction from your arm.

Exercise 5: Balance in motion
This exercise illustrates how movement affects body-balance.
Step 1. Assume a balanced stance.
Step 2. Draw large and then small circles in the air in front of you with your right arm. Allow your body to move as it is naturally inclined to do.
Step 3. Draw spirals, figure eights and other shapes of varying sizes. Notice how your body moves. Be aware of the sensations in your feet and the rotation of your hips.
Step 4. Draw circles or other shapes but do **not** allow your body to move.
Step 5. Draw circles or other shapes. Initiate your movements by steering your body with your feet. Allow your arm to react to the movements of your body.
Step 6. Experiment with other motions, such as turning a page of music, drinking a glass of water or bowing with the right arm.
Step 7. Move your left arm as if shifting up and down the whole length of your cello's fingerboard.
Step 8. Put your feet together and draw large and small circles.



(figure 9)[66]

Observations
Some questions you can ask yourself are:
- Do you feel tension when you do not let your body move?
- Do you feel stronger when you steer with your feet?
- Do you feel stronger with your feet apart or together?

Even the slightest motion involves your entire body. Although your body may only move a short distance, your arm can move the same or a greater distance in response to the same body impulse. Your arm moves farther to draw a large circle than to draw a small one. Your body, however, moves the same distance, regardless of how large or small the circle you draw. This is because your body is so much heavier and more powerful than your arm.

Your arm always moves in the opposite direction from your body. When your body moves, your weight rotates from side to side with each motion. You can immediately feel tension when you move your arm without allowing your body to move. When your body moves freely, however, especially when you steer your body with your feet, you feel strong and free of tension.

You feel strong when you have a broader base. Narrowing your base of support by bringing your feet together weakens you and creates tension.

[66] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 39)

Sitting and placement of the feet

"When you're not well-connected to the ground, you tighten your upper body to compensate for the support that you don't feel from the surface under you. When you do feel grounded, your upper body can take its support from your skeleton, making your upper body, arm and hand movements easier and more fluid." – Ralph Strauch, PhD[67]

"Even the simplest movements of the arms can be carried out properly only when the position of the legs is corresponding correct." – Carl Flesch[68]

Back pain is fairly common amongst musicians. The rate of back pain is higher amongst cellists than within any other group of musicians. A major cause for cellists' back pain is faulty sitting. Sitting is more complicated than standing. Standing permits greater freedom of movement. It allows your body to maintain better balance and to shift your weight naturally as you move your arms. This is why violinists and other instrumentalists usually prefer to stand when playing solo.

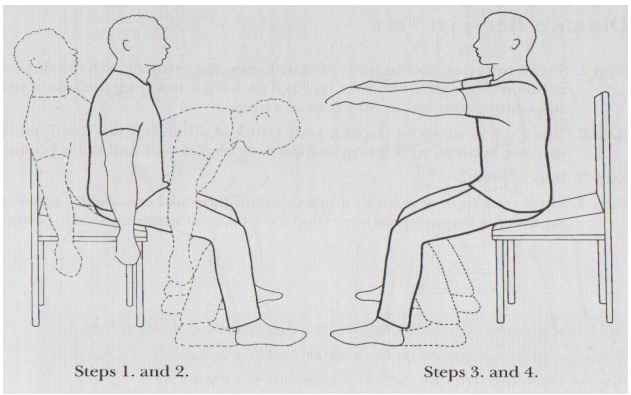
When sitting, the body's balancing mechanism is less obvious. Contact with the seat obscures the direct connection between the feet and the rest of the body. Unfortunately, many cellists are unaware of how important their feet and legs are while playing their instrument.

Unless the feet can fully support all the body's movements, the body cannot be completely balanced. When the feet are not properly placed, the knee and hip joints tend to lock, causing a loss of mobility. It's like a building: if the foundation is not well constructed the whole building is out of balance.

The next exercises will show how to achieve optimal placement of the feet.

Exercise 6: Foot placement when sitting
This exercise explores different foot placements without the cello. Preform the breath test with each step.
Step 1. Sit tall on the front edge of your chair and place your feet:
- Behind your knees
- Straight down from your knees
- Various distances in front of your knees

Step 2. Test each position by moving your trunk forward and backward. Find the position which feels most comfortable and stable
Step 3. Repeat step one
Step 4. Raise your arms to find the foot placement that makes your arms feel the lightest.



(Figure 10)[69]

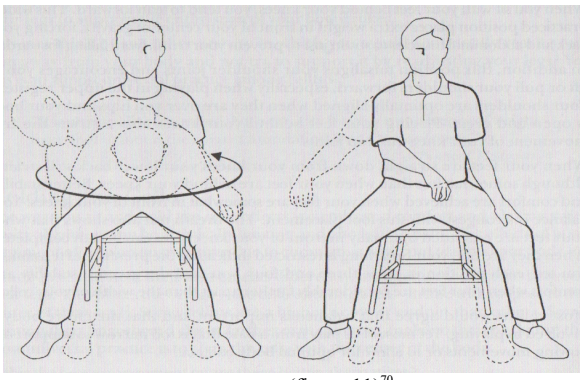
Observations
Some questions you can ask yourself are:
- Which foot placement provides the greatest comfort and stability in step 2?
- Which foot placement makes your arms feel the lightest in step 4?
- How does this differ from the way you usually place your feet?

[67] Certified Feldenkrais Practitioner, www.somatic.com
[68] C. Flesch (1924) The art of Violin Playing, Carl Fischer, Inc, New York
[69] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 65)

When you sit with your feet behind your knees, you tend to lean forward. This position places extra weight in front of your center of gravity, forcing your back and abdominal muscles to strain just to prevent your trunk from falling forward.

In addition, this position misaligns your shoulder joints and encourages you to lift or pull your shoulders forward, especially when playing in the upper registers. Placing your feet behind your knees also restricts the free movement of your knee and hip joints. Better stability and comfort are achieved when you place your feet a little in front of your knees. Your balance is strongest with this foot placement. The Breath Test also shows that when your feet are placed in front of your knees you can breathe completely. When they are not, your breathing is restricted which indicates the presence of tension.

Exercise 7: Distance between feet
This exercise explores different foot placements without the cello.
Step 1. Sit tall with your feet in front of your knees. Experiment with the distance between your feet. Place your feet as if each leg is touching the side of your cello. Move your feet apart a little at a time.
Step2. Test each position by circling your trunk in all directions. Readjust the distance between your feet to find the most comfortable and stable position.
Step 3. Repeat step 1.
Step 4. Move your right arm back and forth to simulate full bow strokes, adjusting the distance between your feet to find the most comfortable and stable position.



(figure 11)[70]

Observations
Some questions you can ask yourself are:
- Which foot placement provides the greatest comfort and stability in step 2?
- Which foot placement provides the greatest comfort and stability in step 4?
- How does this compare with the way you usually place your feet?

You may have noticed that widening the distance between your feet can make cello playing more easy. This alignment provides a broad enough base to maintain the best balance. It also allows your legs to support the entire span of your bow strokes.

Sources of Physical Power

"Only this impulse coming from the center of the body instead of each extremity will group different movements in a unified whole" – Pablo Casals[71]

A common assumption is that muscles are the only source of the body's power. This assumption isn't true however, because even the strongest person is weak if they are not well-balanced.

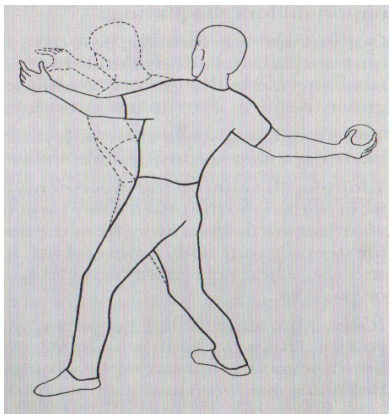
Although muscles move the body and limbs and bones provide a system of levers, the primary source of your body's physical power is the natural shifting of weight, in other words: the balancing-mechanism. This mechanism coordinates all body parts as they move to perform physical activities.

[70] V. Sazer (2003) – 'New Directions in Cello Playing, *How to make cello playing easier and play without pain.*'(p. 67)
[71] V. Sazer (2003) – 'New Directions in Cello Playing, *How to make cello playing easier and play without pain*.' (p. 41)

The center of your body resides in its heaviest part, your trunk. When balancing a lighter and heavier body part, the heavier part has more power than the lighter one. Your body anticipates movements of your arms. The center of your body moves first; your arms follow.

When you use this power, your arms respond to a body impulse by moving in the opposite direction. If this process is interfered in any way, your muscles are forced to overwork which creates tension. When your balancing-mechanism is not restricted, your muscles perform efficiently and work enough to accomplish the desired motions. This creates no tension. You can experience this natural balancing-mechanism by imagine throwing a ball.

Exercise 8: Throwing a ball
This exercise explores the natural sequence of body movements which occur when you throw a ball. Consider how this sequens of motion applies to cello playing.
Step 1. Pretend to throw a ball
Step 2. Notice the sequens and direction of your body movements; and
Step 3. Observe what happens to your feet, legs, hips, trunk, upper arms, forearms and hands.



(Figure 12)[72]

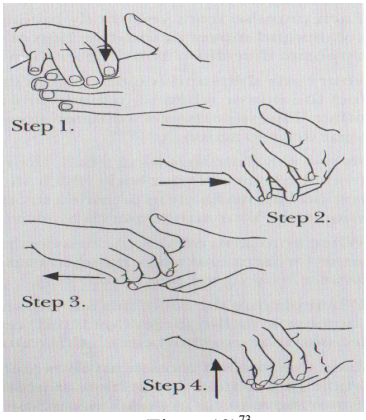
Observations
Each impulse from your body initiates a chain of actions. The center of your body rotates and moves in the direction of the ball's destination as your arm goes in the opposite direction. Your center moves backward as your arm comes forward. Your body shifts and rotates around its center through each phase of motion. You can feel the power when your body lifts and rotates as you balance from one foot to the other. The sequence of motion is always from the heavier to the lighter part of your body.

When playing the cello, this natural sequence of motion can be interrupted. Pressing the bow with the fingers or hand, or pressing the fingers of the left hand creates tension that can disturb this natural flow.

Exercise 9: Press, Push, Lift and Pull
Your body reacts differently to different actions. Some create tension while others do not. This exercise shows how your body reacts to pressing, pushing, lifting and pulling. Perform the breath test with each step.
Step 1. Provide resistance with your left hand as you press lightly against it with a finger of your right hand. Try pressing harder
Step 2. Provide resistance with your left hand as you push it toward the left with your right arm
Step 3. Provide resistance with your left hand as you pull it toward the right with your right arm; and
Step 4. Provide resistance with your left hand as you lift it with your right arm.

Observations:
Some questions you can ask yourself are:
- Do you feel tension in some steps?
- Was your breathing restricted in some steps?

[72] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.*' (p. 44)



(Figure 13)[73]

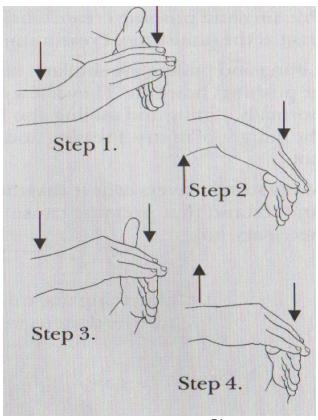
You may have noticed when pressing very lightly you can feel tension appear in your arm. When you press harder you can feel the tension extend all the way to your back. Pushing is similar to pressing since it's the same action but than moving in a different direction.

Pressing and pushing while playing create tension by causing opposing groups of muscles to contract at the same time. Pressing and pushing also compress the joints.

Lifting and pulling are similarly related. However, they have the opposite effect from pressing or pushing. They allow opposing muscle groups to contract and lengthen normally. Lifting and pulling also keep the joints open, minimize tension and reduce the danger of injury. Pressing and pushing create tension, but pulling and lifting do not.

Exercise 10: Leverage
This exercise explores leverage related to the hand, wrist and arm. Perform the breath test with each step.
Step 1. Provide resistance with your left hand as you press down against it with your right hand allowing your wrist to drop
Step 2. Lift your arm to allow your wrist to rise, using leverage to apply downward force against your left hand
Step 3. As in the first step, press downward against your left hand, but without the extreme bend in your wrist; and
Step 4. As is the second step, again, use an upward impulse to bring your fingers downward against your left hand

Observations
Some questions you can ask yourself are:
- Do you feel stronger when you press or lift?
- Do you feel more at ease when you press of lift?

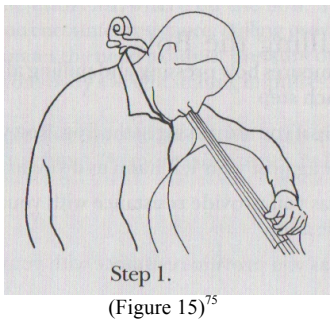


(Figure 14)[74]

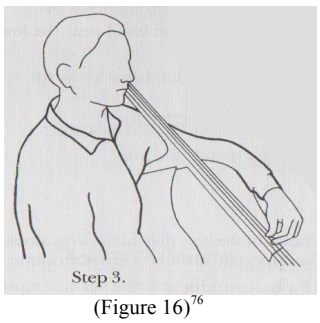
[73] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 46)
[74] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.*' (p. 48)

Lifting to utilize leverage is the most efficient way use your body. It gives you more power than either pressing or trying to apply arm of body weight to either fingering or bowing. When you lift the wrist, the fingers go in the opposite direction. Although a great deal of force is not needed to play the cello, you may observe that the stronger you lift, the more force will go in the opposite direction. If both ends of a lever move in the same direction, leverage is non-existent. The power is in the lift.

Exercise 11: Pressing and lifting at arm's length
This exercise explores the difference between pressing and lifting at arm's length and how they affect your body-alignment. For this exercise we will need our cello. Preform the breath test with each step.
Step 1. Lean forward as you press a string down to play a note near the upper end of the fingerboard
Step 2. Sit upright and press the string down again in the same place
Step 3. Sit upright and play the same note. Use a gentle upward impulse.



(Figure 15)[75]

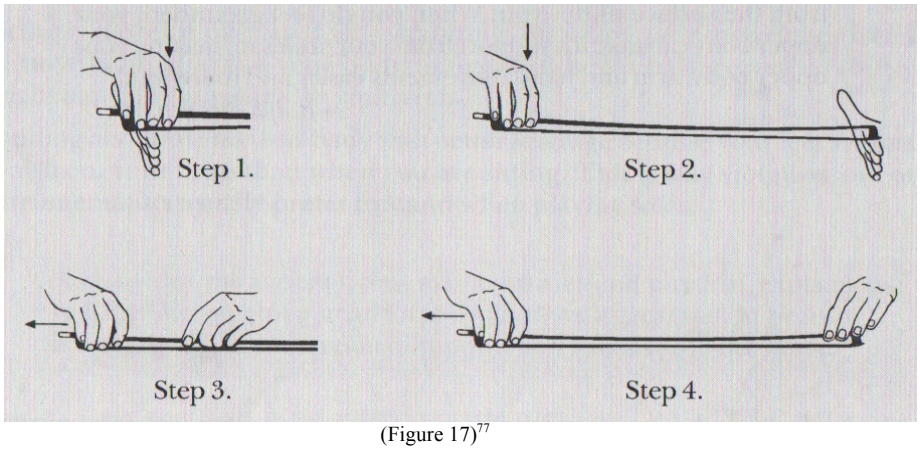


(Figure 16)[76]

Observations
Which was is most comfortable and tension free?

You may have noticed that it is more difficult to press when your left arm is extended than when it is bent. This is why many cellists lean forward, crouch or lean to one side when playing the cello. When you eliminate pressing with gentle lifting impulses, it becomes easier to play the cello.

Exercise 12: Pressing and pulling the bow
This exercise compares how pressing and pulling affect your bowing. Preform the breath test with each step.
Step 1. Hold your bow as if you are playing at the frog. Rest your bow on your left hand
Step 2. Press your bow against your left hand as if you are playing at the tip
Step 3. Pull your bow as you provide resistance with you left hand near the lower part of the bow; and
Step 4. Pull your bow as you provide resistance with your left hand at the tip



(Figure 17)[77]

Observations
Some questions you can ask yourself are:
Does it require more effort to press your bow down at the tip than at the frog?
Does it require more effort to pull your bow at the tip than at the frog?

[75] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 51)
[76] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 51)
[77] V. Sazer (2003) –'New Directions in Cello Playing, *how to make cello playing easier and play without pain.'* (p. 53)

You may have noticed that more effort is required to apply pressure at the tip of the bow than at the frog. Pressure must gradually increase as you move toward the upper part of the bow to sustain a tone.

If arm weight rather than pressing is used for tone production, the balance must be constantly readjusted to maintain the right amount of weight at each location on the bow.

Pulling requires the same effort anywhere on the bow. Your bow arm feels the same regardless of where you encounter resistance. Pulling is your arm's natural response to your body's weight shifting impulses.

Appendix 2

Interview Giovanni Sollima

Giovanni Sollima, the composer of the piece 'Lamentatio' played a concert on the 9th of December 2014 in de Doelen, Rotterdam. I had the opportunity to meet and interview him after the concert. I asked him if he had the same issue concerning tension while playing his own piece.

Susanne: "Hi, my name is Susanne and I'm also a cellist. Currently I'm doing a master study at Codarts School of Arts in Rotterdam. I'm doing a research and it's partly about a piece of yours: 'Lamentatio'. My research is about finding the right balance between muscle tension and relaxation to be able to play free and without pain your piece 'Lamentatio'. Every time I play your piece I feel a lot of pain in my right hand and shoulder. *Do you have the same experience while playing this piece?"*
Giovanni Sollima: "What an interesting topic for a research and how nice to hear you're playing my piece. I don't have this problem of pain with this piece but it can appear in other repertoire. I think it has to do with something very important: the right way of breathing. That's very important! Do you dance sometimes? You should dance with and without your instrument."
Susanne: "*Do you mean sitting of standing?"*
Giovanni: "Sitting, standing, running or walking, always. You have to get rid of all this extra tension. We are stage machines, the arm needs to be free. Your hands need to be free. The triangle of the right hand between first finger, thumb and pink needs to be firm, but the middle fingers are consonant and soft. If you are well aware of the relationship between these fingers and its function, that's all you need. In this way I can play Shostakovitch's pieces six times in a row without a having to stop. When the music is very powerful and loud your body must be like when you swim or like when you dance or fly."
Susanne: "*Do you have any experience with techniques which give us more insight on how to use our bodies efficiently like Alexander Technique or Feldenkrais?"*
Giovanni Sollima: "Yes I'm familiar with these techniques, but I'm using something else when I teach. You cannot generalize, everybody's different. I try a lot in my lessons to play like that, just to feel how it is. I try to make my own methods in the lessons with students. I try to find a solution for every difference student. But most of it is also emotional, most of it is in the head. That's really important to know. But write me about your investigations and if you have any questions you can always call of send me an email. Let's stay in touch."

(Figure 18)[78]

[78] This picture was taken in 2014 after the concert and interview.

Appendix 3

Self-Experiment April 2015

The elements which I wanted to incorporate into my playing were:

- Placement of the feet
- Relaxing the legs
- Breathing during the playing

When I'm placing my feet a little in front of my knees, my legs are able to relax and my breathing won't be restricted. For seven days I recorded myself playing the first couple of minutes from the piece 'Lamentatio' by G. Sollima and tried to incorporate these elements into my playing. My goal was to reduce physical tension by adjusting the lower part of my body.

Diary

Day	Observations
Day 1: April 3, 2015 Memory stick: track 7 YouTube link: https://youtu.be/FkcIHSFtlH8	'I already felt much more relaxed while playing in this position. But it took me a lot of effort to keep my legs relaxed. I discovered that tensing my legs became a habit of mine. A positive thing is that I didn't have the tendency to raise my feet anymore while playing. This was easy for me to adjust. Breathing freely was still tricky, I had to remind myself a lot. But when I tried to relax my legs, it immediately effected my breath in a positive way. I had the feeling that I'm able breathe more deeply. I hope that in the future I do not need to remind myself to relax and to breathe correctly, so I have more mental calmness and space to think of other elements like phrasing etc.'
Day 2: April 4, 2015 Memory stick: track 8 YouTube link: https://youtu.be/sN6LCB2WZiQ	'Today I felt that my body had difficulties finding the right balance and posture. While watching the video, I noticed that my feet are not placed on the same level, so that might be the reason. I didn't have to remind me as much as yesterday to relax my legs which is positive. Still, I had to remind myself a lot to breathe correctly. Maybe I should separate the elements, and don't try to combine them all at the same time.'
Day 3: April 5, 2015 Memory stick: track 9 and 10 YouTube links: - https://youtu.be/Wcr3n0tzB10 - https://youtu.be/BgRqoLySgJ0	'Today I recorded myself twice. During the first recording I tried to be aware of the relaxation of my legs. Today I had to remind myself a lot to relax my legs, but the placement of my feet was much better than the day before. The second time recording I completely focused on my breathing. In general I felt much more relaxed. It only effected my memory a little bit since at a certain moment I didn't know what to play for a short while. (around 2 min. 18)'
Day 4: April 6, 2015 Memory stick: track 11 and 12 YouTube links: - https://youtu.be/GH8teguJlrI - https://youtu.be/1UjrRU8YM1s	'I felt very relaxed the first time recording when I tried to be aware of the relaxation of my legs. I didn't have to remind myself all the time, which gave me space to focus more on musical elements which is shown on the recording I think. Again I suffered from memory loss the second time recording, when I tried to be aware of my way of breathing. At a certain moment even my bow almost drops out of my right hand which mostly never happens to me. (around 2 min. 25)'

Day 5: April 7, 2015 Memory stick: track 13 and 14 YouTube links: - https://youtu.be/TTVv7K_9Mb8 - https://youtu.be/Ttz_VmA-EXk	'I noticed that I was much more able to relax my legs when I'm wearing comfortable trousers. (The previous day I wore sweatpants) This is something to think of when playing concerts. During the second time recording it was already much easier to maintain a constant free and complete way of breathing. Although I needed to remind myself from time to time. But this time no memory loss and falling bows.☺'
Day 6: April 8, 2015 Memory stick: track 15 YouTube link: https://youtu.be/hHz6kgBdZig	'Today I decided not to record myself twice. I tried to incorporate all the elements at the same time, just as at the beginning of the week. I felt quite relaxed today and al the elements were much more easy to apply, but I felt a bit tired today which made me sound a little bit passive in my opinion.'
Day 7: April 9, 2015 Memory stick: track 16 YouTube link: https://youtu.be/Mo_2v2ppYMc	'The last day of the experiment: I felt much more relaxed in my playing, my breath wasn't restricted anymore which felt really good. When watching all the video material, I noticed that I have the tendency to look down at my fingers. I think this would be the next step to achieve: total body-balance and a straight upper body.'

Appendix 4

Questionnaire Posture Peg
I wrote an email to cellists I found on the internet who are using the posture pegs. The email includes a questionnaire which I asked them to fill in. The email:

Dear,

My name is Susanne Rosmolen and I am a professional cellist. Currently I'm in the last phase of my master study at Codarts School of Arts in Rotterdam, The Netherlands. My research question is: '*How can I find the right balance between muscle tension and relaxation to be able to play the cello without physical limitations and to play without pain*?' I discovered that body posture is a very important subject which relates to this question. I've installed a posture c-peg on my cello to be able to sit straight. Before I wasn't able to sit straight behind my cello since the c- peg was pinching in my neck which created a lot of tension.

If I'm correct, I've noticed that you also use the posture pegs on your cello. I was wondering if you could answer some questions for me which can help my research.

- How long have you been playing with the posture peg on your cello?
- What was/are the reason(s) for adding this to your instrument?
- Did it effect your playing? If yes, in which way(s)?
- Did you try to find other solutions? What were they?
- Would you recommend the posture peg to other cellists?
- Do you know anyone else who uses it?
- Any other thoughts?

Many thanks in advance and best wishes!

Kind regards,

Susanne Rosmolen

Interview Regina Mushabac
Dear Susanne, Yes, I do use the posture peg for my c string. I used to use it also for the g string, but decided it wasn't really needed. To answer your questions:

- *How long have you been playing with the posture peg on your cello?*
About 14 years

- *What was/are the reason(s) for adding this to your instrument?*
I wanted to have an elongated spine, not curved at the neck. I had been having troubles with my right hand and I was advised by Feldenkreis teachers (and Alexander teachers) that it might help.

- *Did it effect your playing? If yes, in which way(s)?*
I got better eventually, so I think it did help. And immediately my neck felt better. Now when I play someone else's cello, it is an uncomfortable adjustment.

- *Did you try to find other solutions? What were they?*
Yes, I also added a rubber bit on my bow, which I never play without. That too was about 15 or more years ago. It's called Supersensitive bow master. It's a sort largish contraption, about 4 inches long which I cut back to about 1.5 inches and put on my bow near the frog. It relieves the pressure on the nerve ending on the right thumb. That really helped and has been invaluable too.

- *Would you recommend the posture peg to other cellists?*
Definitely. Some of my students have used it and still are playing with it. Mostly helpful for the tall ones especially.

- *Do you know anyone else who uses it?*
Yes, my students, some.

- *Any other thoughts?*

I tried all kinds of things, but it was years ago and nothing comes to mind worth explaining. This was definitely the best. Hope that helps. Regina. Ps.How do you know me? I don't recognize your name.

Reply Jakob Koranyi

"So, I use the peg because it allows me to raise my head and just have more flexibility for my posture. I can't say I had any problems before the switch but I definitely prefer the new peg to the old. It's simply more comfortable. One downside is that you have to notoriously keep track of the key and in a few pieces where you have to change the tuning of your C string it might be a bit unpractical or even impossible.
There is a different solution to the problem of head/neck comfort and freedom that was described to me by Finnish instrument guru Eero Haahti. You should contact him and maybe ask him to send you a picture of his version as I think it sounds very promising. ehaahti@gmail.com. I've been meaning to pay him a visit for years to try it out but you know how things can be... I do think Truls Mørk uses the posture peg I use but I can't swear it. Hope this was of any help for your work and let me know if you have any further questions. Good luck!"

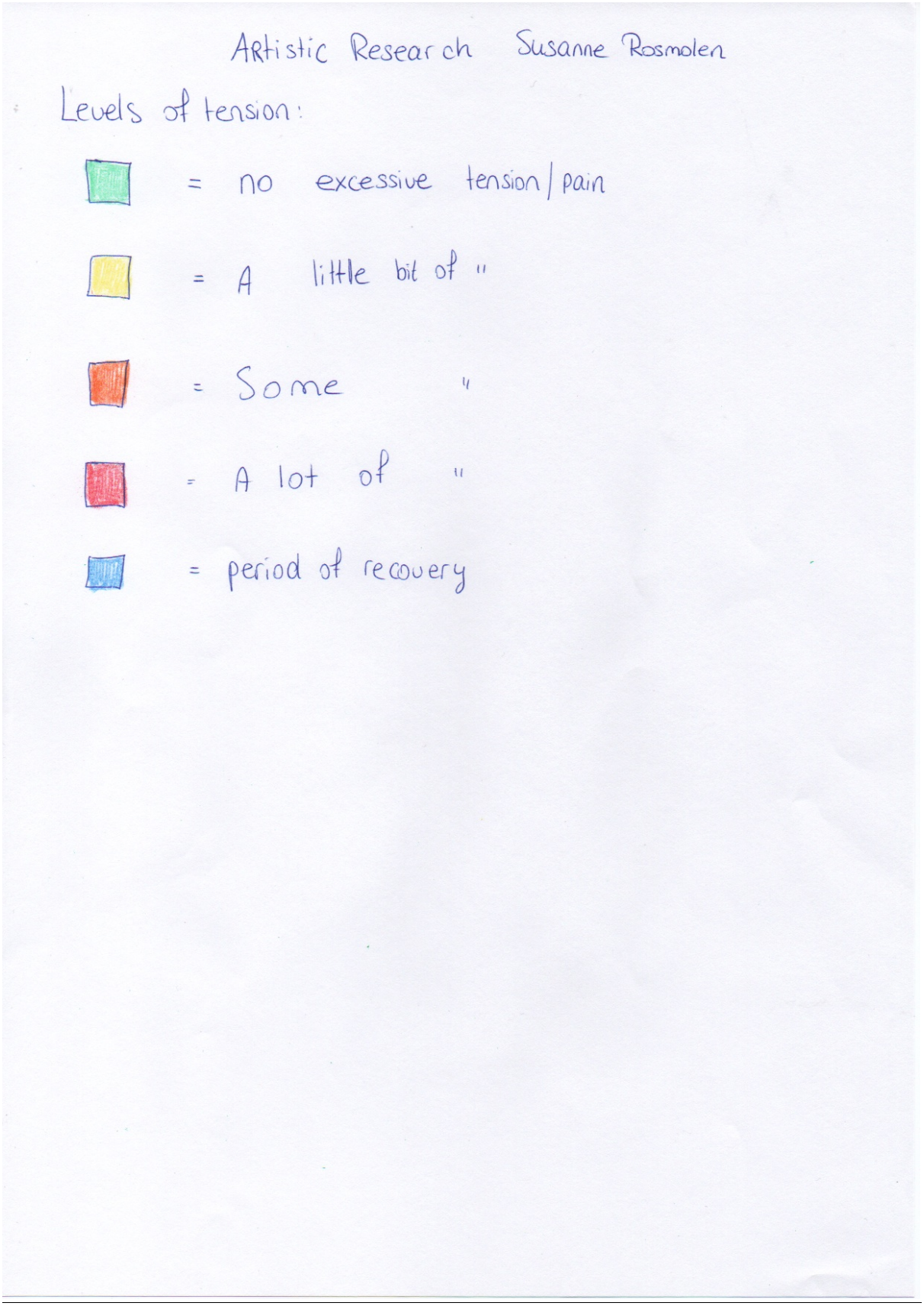
Appendix 5

Diary from self-experiment on breathing September 2015

Day	Observations
Day 1: September 28th, 2015 *What did I do?* - During the first exercise I played a note with a constant vibrato. First I exhaled on the down bows and inhaled on the up bows. After that I switched it around. Thirdly I inhaled and exhaled in the middle of the bow. - Instead of playing a single note I made a shift during the second exercise. First I exhaled on down bows, inhaled on up bows. Second I exhaled on up bows, inhaled on down bows. - I played the first version of the score of the piece 'Lamentatio', by breathing out while playing down bows and breathing in while playing up bows. Memory stick: track 17,18 and 19 YouTube links: - https://youtu.be/oO3TpcMcJI8 - https://youtu.be/Uysfiu4O2y8 - https://youtu.be/KwlBaVbjVDE	'Breathing out while playing a down bow felt really comfortable. I liked the sound that I produced. The sound was very open and relaxed. It took me some effort to breath correctly when inhaling in the middle of the bow. It was a bit confusing, just as breathing during the shifts. I didn't always feel comfortable breathing out to the mouth. It felt more natural to breathe out to the nose. I felt nice to synchronize the breathing with the piece, but I had the feeling that I was breathing too many times because of the amount of bow changes. I didn't actually need so much different breaths while playing the piece. It made me feel a little light headed by the end of the session.'
Day 2: September 29th, 2015 *What did I do?* I did the same two exercises as yesterday because it takes some practice and to get used to the feeling. I planned to repeat it every day. After I played the second version of the score of the piece 'Lamentatio', by breathing in while playing down bows and breathing out while playing up bows. Memory stick: track 20, 21 and 22 YouTube links: - https://youtu.be/_kQ6DPs8w0A - https://youtu.be/f9G2IbsbwII - https://youtu.be/uCEytbCNG9k	'I changed the pitch of the note to have more variation. The two breathing exercises were already less confusing than yesterday. I noticed that when I made an upward shift it was really nice to exhale at the same time. The shifts didn't go so well when I needed to inhale. This is very interesting for me. I think it's useful to apply this in other repertoire as well. Inhaling on up bows felt very unnatural. I didn't think the opening of the piece was very well performed due to breathing this way. I had to think a lot since it didn't feel natural and it even effected my memory negatively.
Day 3: September 30th, 2015 *What did I do?* I did the same two exercises as yesterday. After I played the beginning of the piece 'Lamentatio', but then I didn't think so much about breathing while up or down bow, but let it come naturally. Memory stick: track 23, 24 and 25 YouTube links: - https://youtu.be/kxm_ZWpl7As - https://youtu.be/qKp0UgnHcww - https://youtu.be/PFti5Smy1Bg	'The breathing exercises felt very natural. My conclusion is that I felt most comfortable breathing out when playing a down bow and a shift, especially upwards. During the piece I experienced that I naturally incline to do the same, so breathing out when playing a down bow and a shift.'

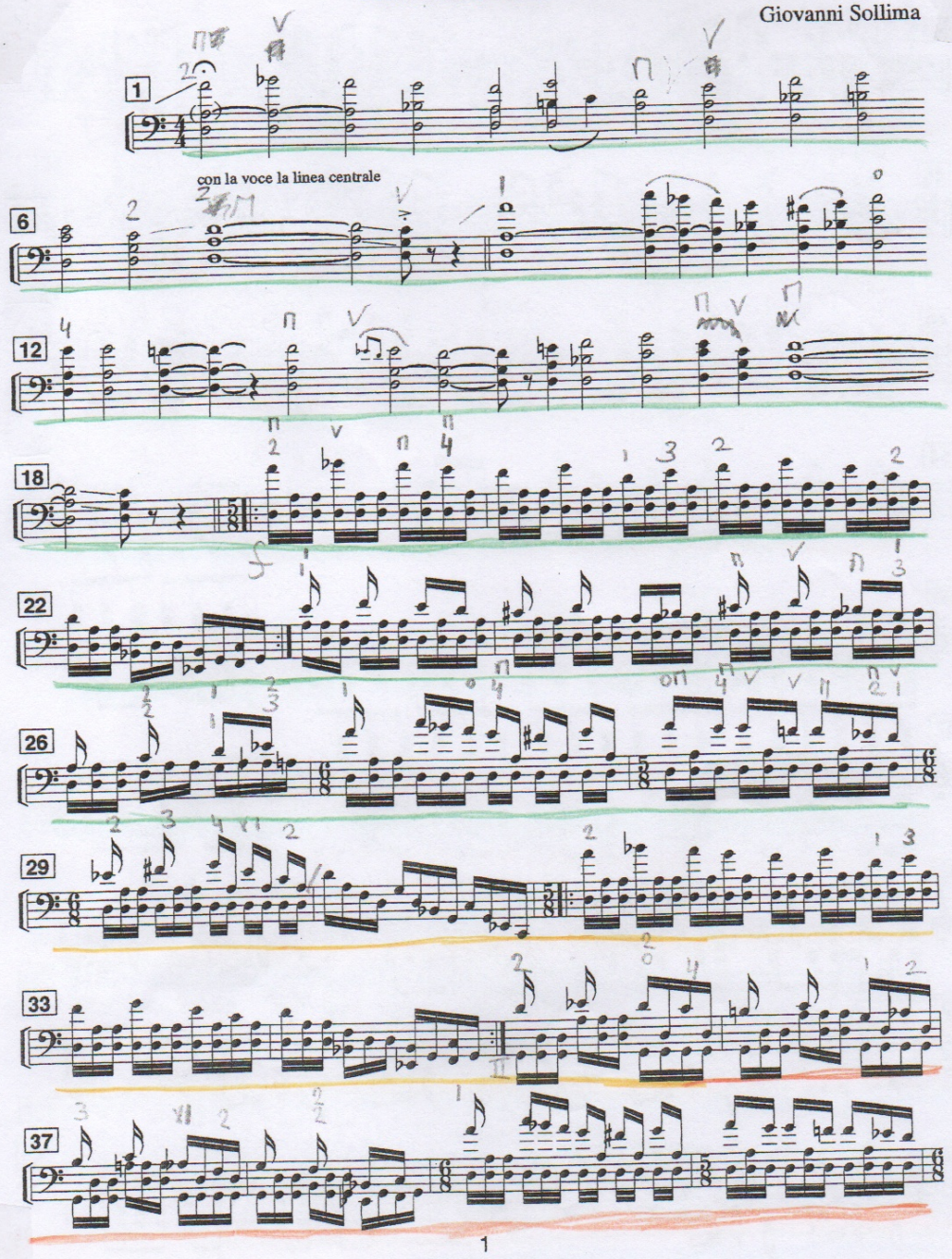
Appendix 6

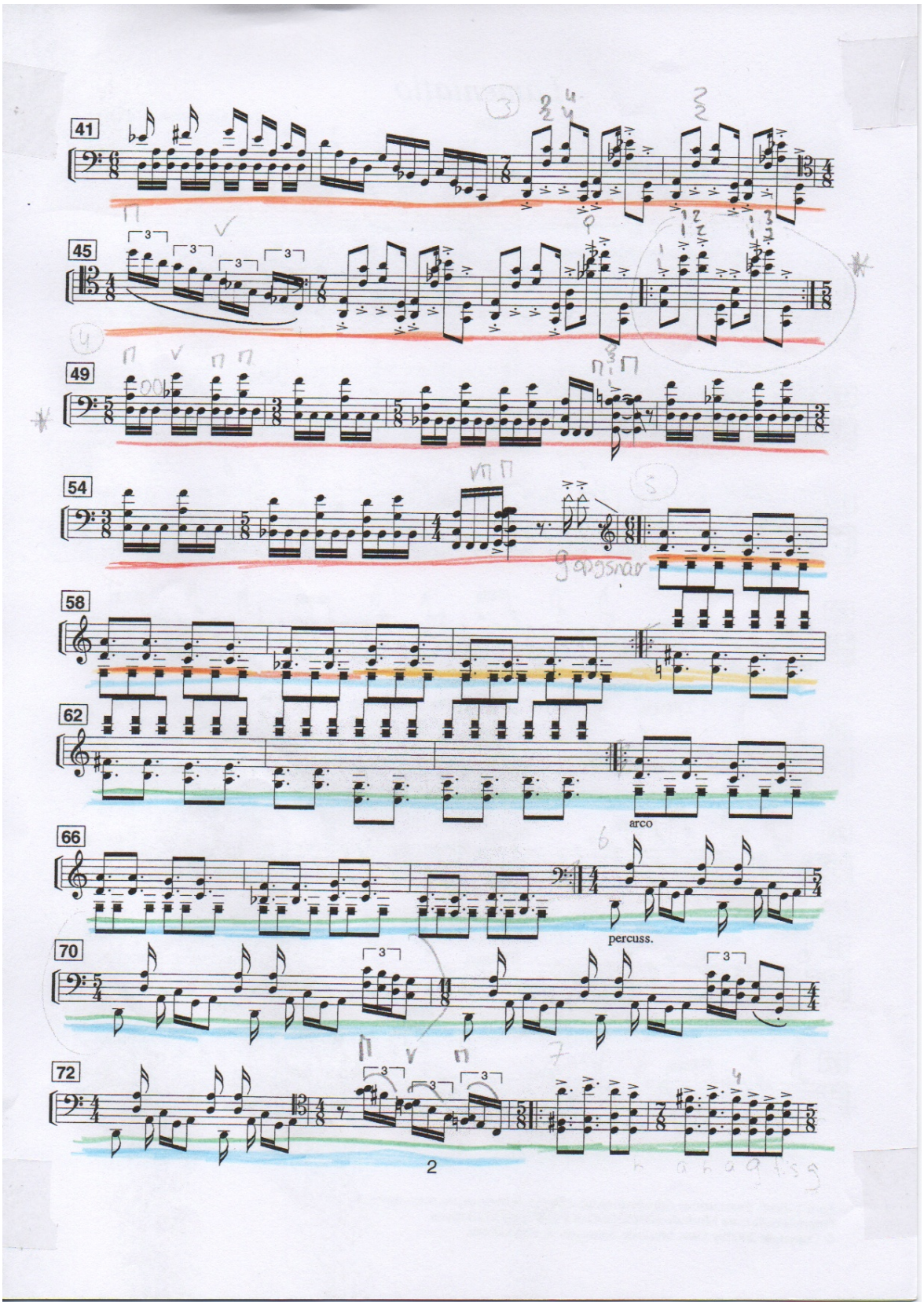
Score 1: Tension levels beginning of research



Lamentatio

Giovanni Sollima

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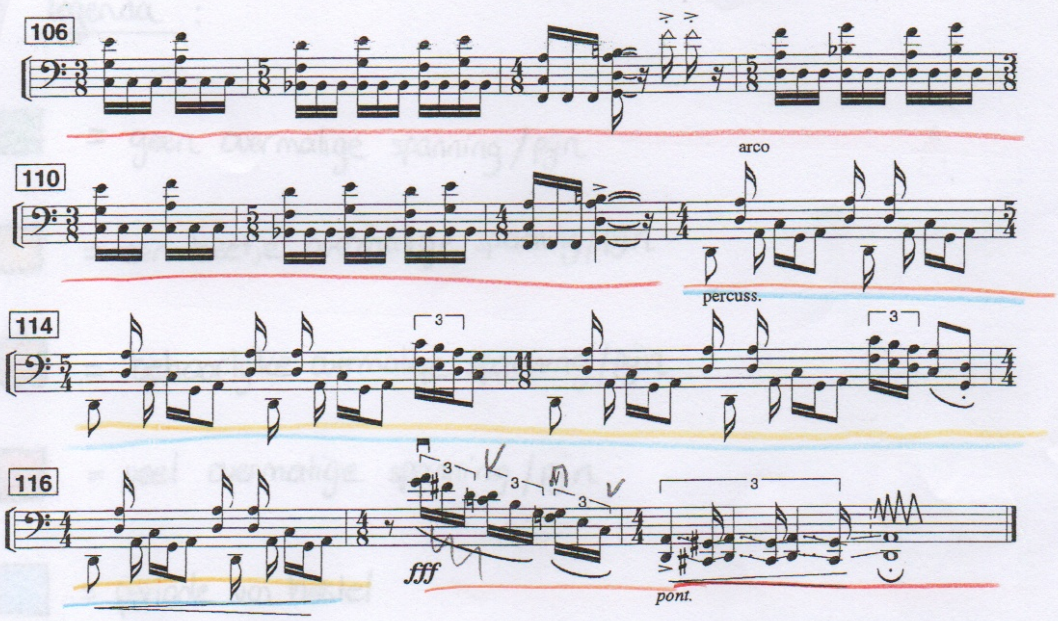
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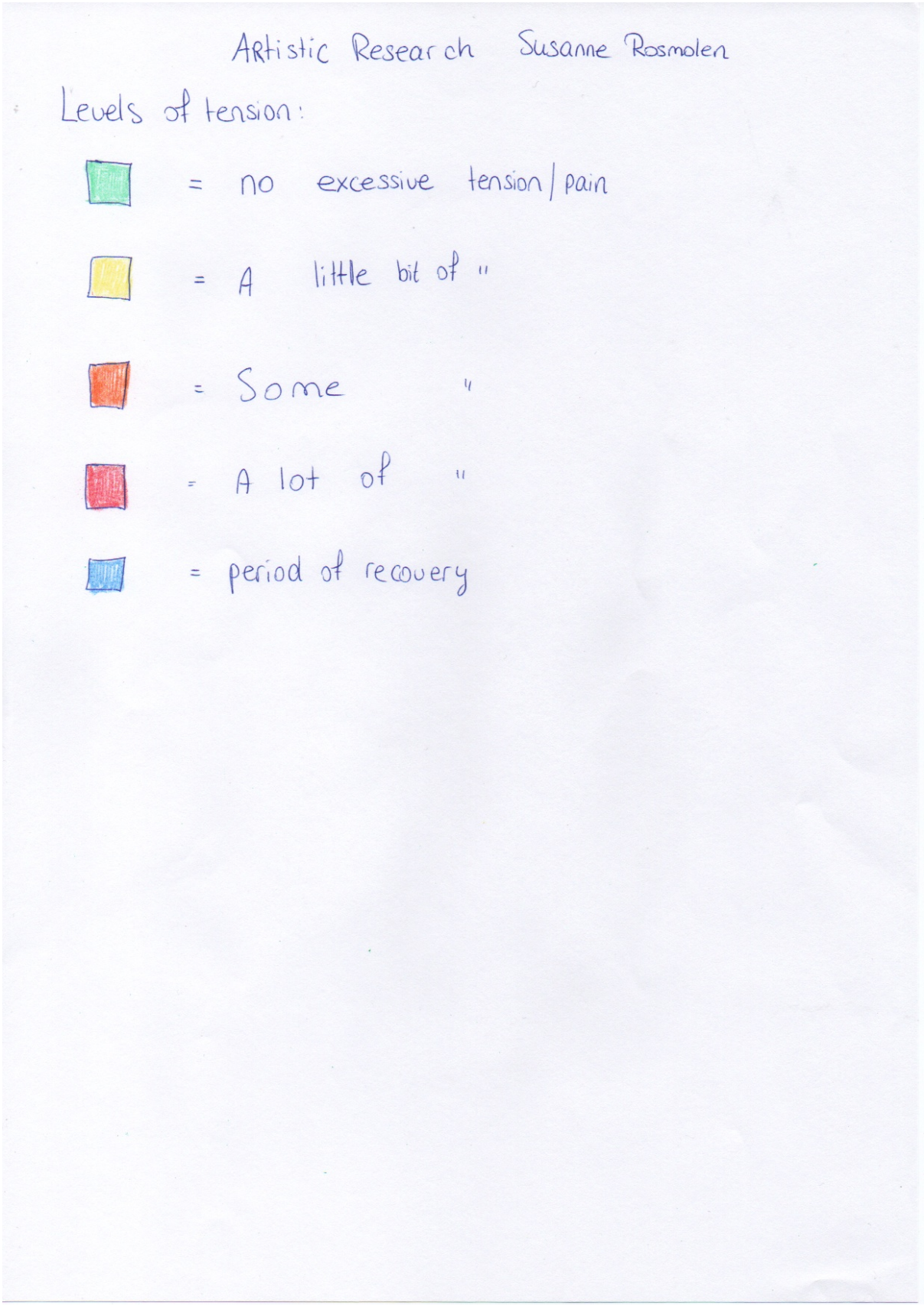
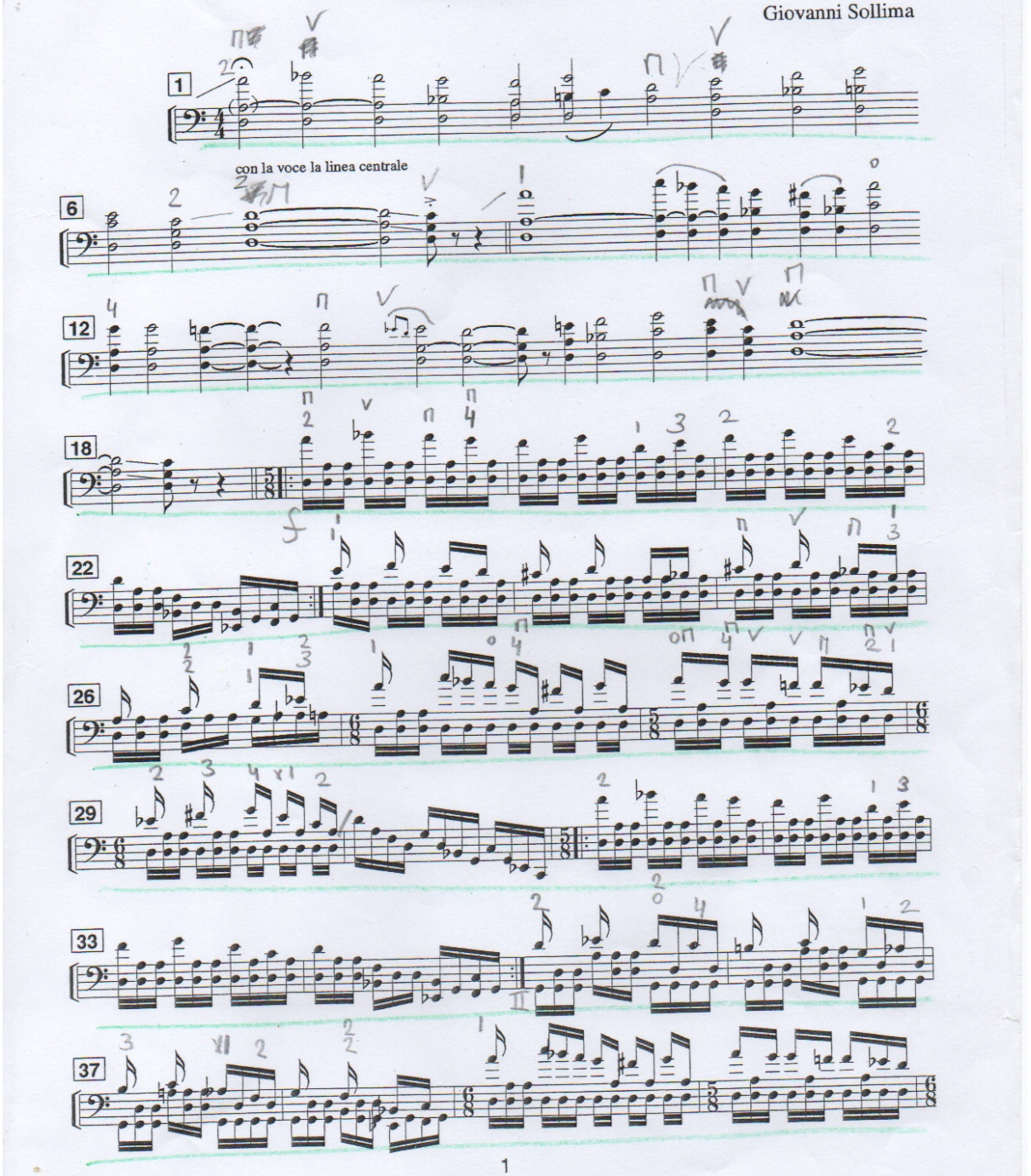
Appendix 7

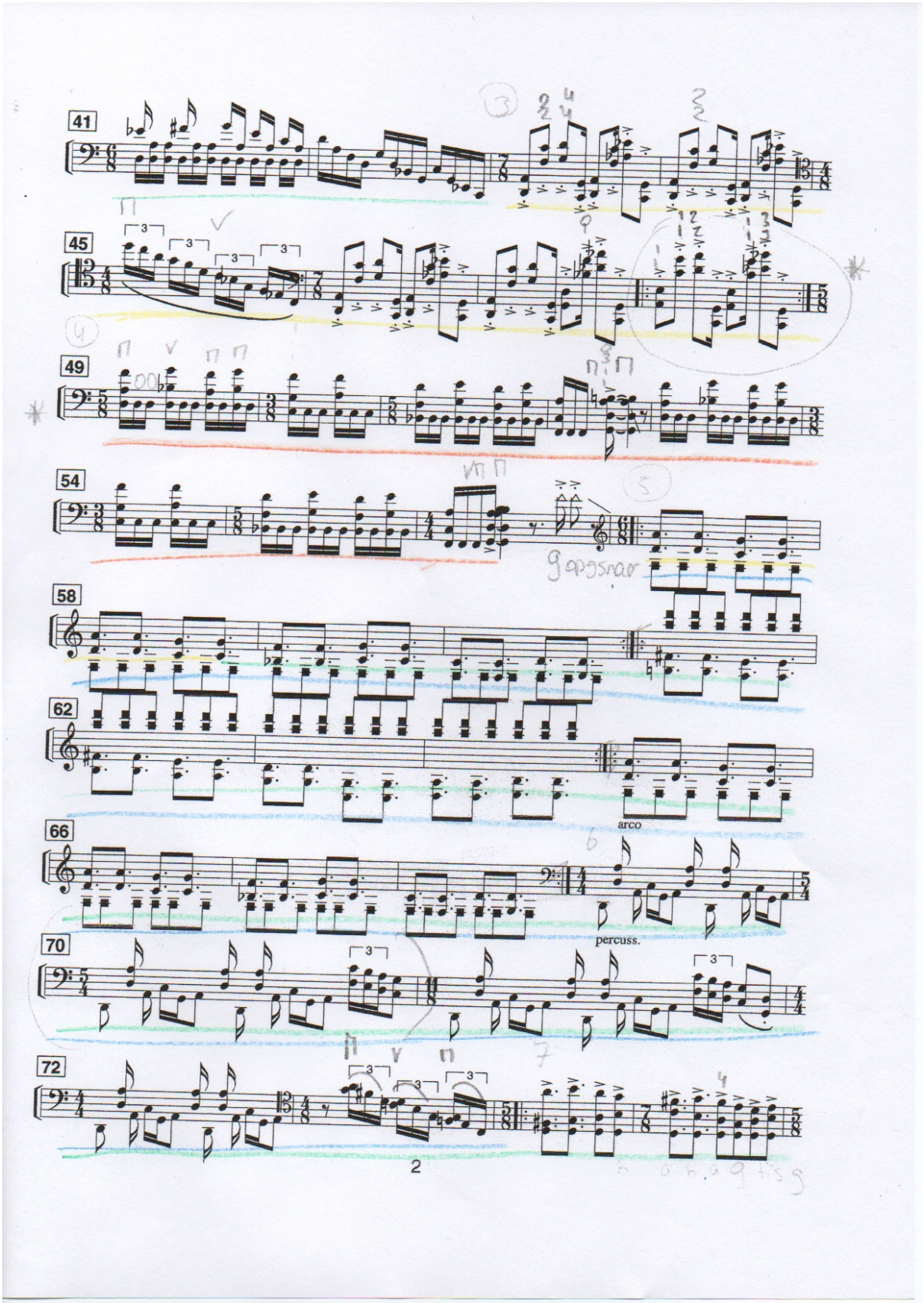
Score 2: Tension levels end of research



Lamentatio

Giovanni Sollima

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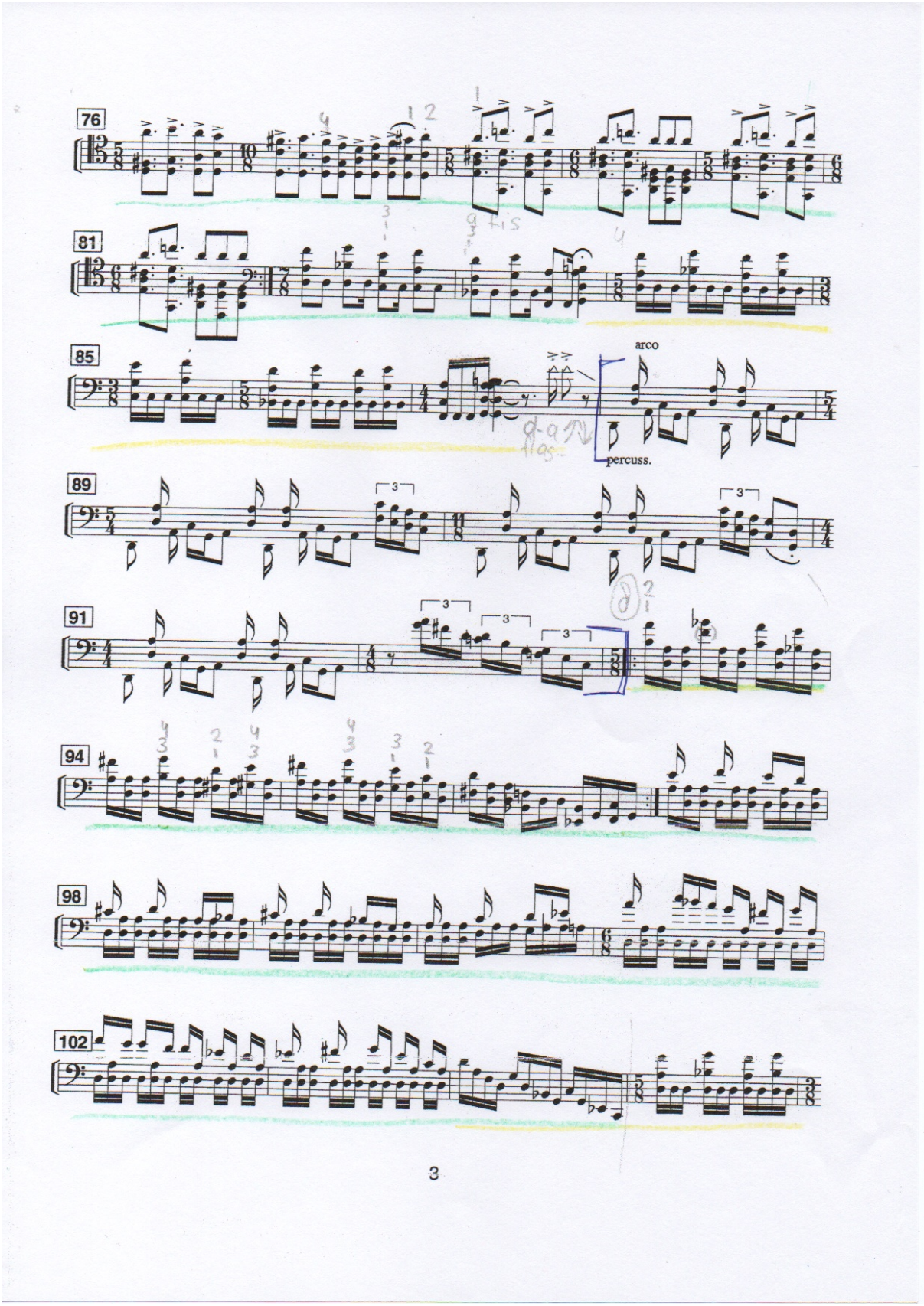
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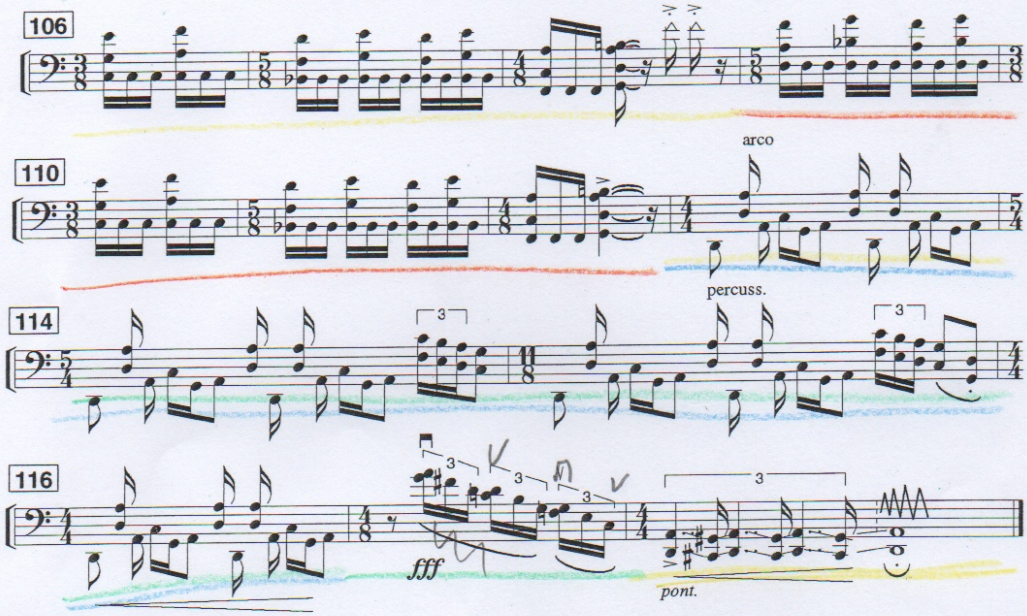
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Appendix 8

Questionnaire Workshop Zutphen

Pre-Workshop Questionnaire

Name: …….....

Age: ……

Year's playing the cello: ……

Experience with physical tension:
Please mark only one answer per question:
1.) My physical tension while playing the cello in a non-stressful situation (e.g., at home) is:
O None ,
O Hardly any,
O A little,
O Some,
O A lot ,
O A great deal

2.)My physical tension while playing the cello in a stressful situation (e.g., at audition) is:
O None
O Hardly any
O A little
O Some,
O A lot,
O A great deal

3.) Are there certain physical actions during playing which cause extra physical tension? If 'yes', which ones?

4.) Do you feel more physical tension with certain repertoire in comparison with other repertoire? If 'yes', which repertoire and why do you think this it the case?

5.) What do you consider the cause of physical tension in general?

6.) What can you do to prevent it?

7.) Have you tried reducing physical tension in your playing? If 'yes', what did you try?

8.) Are you suffering from any injury right now or did you have an injury in the past? If 'yes', which one(s)? If 'no' you are now finished this questionnaire.

9.) What do you consider the cause of this injury?

10.)Did this injury affect your playing? If 'yes', in what way(s)?

11. Did you find a remedy for this injury? If so, what was it? In not, what else would you like to try?

Questionnaire immediately following excerpt

Please mark only one answer per question:
1.) The amount of physical tension I felt while playing the excerpt was:
O None (if 'none', this is your final question)
O Hardly any
O A little,
O Some ,
O A lot
O A great deal

2.) In which part(s) of you body did you notice physical tension?

3.) What do you consider to be the cause of this physical tension?

4.) Did this physical tension affect your playing? If 'yes', in which way(s)?

"The Breath test"

Breathe deeply using diaphragmatic breathing as you perform each of the following steps.

1. Assume a balanced stance
2. Lean your head forward
3. Lean your head to one side
4. Turn your torso a few degree to one side
5. Rotate your torso gently from side to side with even, continuous motion
6. Lean your torso slightly forward
7. Hold your elbow a bit behind your back
8. Lift one or both of your shoulders
9. Experiment with other body positions

Questionnaire 1. "The Breath-Test"

1.) Is your breathing restricted in some positions? If yes, in which ones?

2.) Can you breathe more freely in some positions than in others? If yes, in which ones?

"Three ways of walking"

Perform the breath test with each step.

1. Walk, pressing your feet downward against the ground
2. Walk, relaxing your body weight downward
3. Walk, maintaining a balanced stance. Focus on lifting your body. Be sure that your pivot from the heel to the ball of each foot
4. Repeat the first three steps, holding your hands on your hips

Questionnaire 2. "Three Ways of walking"

1.) Which way gives you the greatest feeling of strength, buoyancy and well-being?

2.) Which way allows your hips to rotate freely?

3.) Which way allows you to breathe most freely?

"Balance in motion"

This demonstration illustrates how movement affects body balance.

1. Assume a balanced stance
2. Draw large and then small circles in the air in front of you with your right arm. Allow your body to move as it is naturally inclined to do.
3. Draw spirals, figure eights and other shapes of varying sizes. Notice how your body moves. Be aware of the sensations in your feet and the rotation of your hips.
4. Draw circles or other shapes but do not allow your body to move.
5. Draw circles or other shapes. Initiate your movements by steering your body with your feet. Allow your arm to react to the movements of your body.
6. Experiment with other motions, such as turning a page of music, drinking a glass of water or bowing with the right arm.
7. Move your left arm as if shifting up and down the whole length of your cello's fingerboard.
8. Put your feet together and draw large and small circles.

Questionnaire 3. "Balance in Motion"

1.)Do you feel tension when you do not let your body move?

2.) Do you feel stronger when you steer with your feet?

3.) Do you feel stronger with your feet apart or together?

"**Foot placement when sitting"**

This demonstration explores different foot placements without the cello. Perform the breath test with each step.

1. Sit tall on the front edge of your chair and place your feet:
- Behind your knees
- Straight down from your knees
- Various distances in front of your knees
2. Test each position by moving your trunk forward and backward. Find the position which feels most comfortable and stable
3. Repeat step one and
4. Raise your arms to find the foot placement that makes your arms feel the lightest

Questionnaire 4. "Foot placement when sitting"

1.) Which foot placement provides the greatest comfort and stability ?

2.) Which foot placement makes your arms feel the lightest when you lift your arms?

3.) How does this differ from the way you usually place your feet?

"Distance between feet"

1. Sit tall with your feet in front of your knees. Experiment with the distance between your feet. Place your feet as if each leg is touching the side of your cello. Move your feet apart a little at a time.
2. Test each position by circling your trunk in all directions. Readjust the distance between your feet to find the most comfortable and stable position
3. Repeat step 1
4. Move your right arm back and forth to simulate full bow strokes, adjusting the distance between your feet to find the most comfortable and stable position.

Questionnaire 5. "Distance between feet"

1.) Which foot placement provides the greatest comfort and stability in step 2?

2.) Which foot placement provides the greatest comfort and stability in step 4?

3.) How does this differ from the way you usually place your feet?

"Pressing and lifting at arm's length"

This demonstration explores the difference between pressing and lifting at arm's length and how they affect your body alignment. For this exercise we will need our cello. Preform the breath test with each step

1. Lean forward as you press a string down to play a note near the upper end of the fingerboard
2. Sit upright and press the string down again in the same place
3. Sit upright and play the same note. Use a gentle upward impulse.

Questionnaire 6. "Pressing and lifting at Arm's Length"

1.) What happened to your breathing when you were leaning forward?

2.) Which way is most comfortable and tension free?

"Pressing and pulling the bow"

This demonstration compares how pressing and pulling affect your bowing. Preform the breath test with each step

1. Hold your bow as if you are playing at the frog. Rest your bow on your left hand and press
2. Press your bow against your left hand as if you are playing at the tip
3. Pull your bow as you provide resistance with you left hand near the lower part of the bow and
4. Pull your bow as you provide resistance with your left hand at the tip

Questionnaire 7. "Pressing and lifting at Arm's Length"

1.) Does it require more effort to press your bow down at the tip than at the frog?

2.) Does it require more effort to pull your bow down at the tip than at the frog?

Final Questionnaire small group workshops

1.) Did you notice any difference between the first time you played the excerpt and the second time? If so, what is the difference?

2.) Did you notice a change in physical tension the second time you played the excerpt? If so, what was the change?

3.) We addresses four aspects to help reduce physical tension. Which of these aspects do you believe helped you the most in reducing physical tension?
O Breathing
O Balance
O Way of sitting/placement of the feet
O Lifting and pulling

Final Questionnaire entire workshop

1.) What did you think about the "Pre-playing Routine"?

2.)Did it help you during your performance? If yes, in which way(s)?

3.)Did you notice any difference in your way of playing during the concert than the way you usually play? If yes, in what way(s)?

4.) Would you apply any of the aspect you learned from the workshop such as breathing, way of sitting, placement of the feet, balance and the "Pre-playing Routine" to your playing in the future?
We would appreciate your feedback an the workshop and Susanne's instructions! Any remarks, or advice?

Thank your for participation and for completing this questionnaire!

Appendix 9

Blind Judge questionnaire for quasi experiment Zutphen

The blind judges were my Alexander Technique teacher/cellist Doris Hochscheid and my main subject teacher Jeroen den Herder. They analyzed short movie excerpts from cellists who participated my workshop in Zutphen. They did not know which excerpt was filmed before or after the workshop.

I asked them to fill in this questionnaire:

Please circle A or B:
1.) Which video do you believe shows the best playing in terms of sound production?

A B

2.) Which video do you believe shows the best body posture?

A B

3.) Which video do you believe shows the best playing in terms of quality of intonation?

A B

4.) Which video do you believe shows the cellist playing in the most relaxed manner?

A B

5.) Which video do you believe shows the cellist playing with the most physical freedom?

A B

6.) Do you have any additional thoughts when observing video's A and B?

A: …….

B: …….

The YouTube link of the films are:

Alberto Video A (recorded after workshop): https://youtu.be/4ttuWXdsQTo
Alberto Video B (recorded before workshop): https://youtu.be/ehdwrRDrsc4

Pedro Video A (recorded after workshop): https://youtu.be/ac2meujzLWE
Pedro Video B (recorded before workshop): https://youtu.be/BZQbXxxr6cQ

Sebastiaan Video A (recorded before workshop): https://youtu.be/5lNoQ1v34os
Sebastiaan Video B (recorded after the workshop): https://youtu.be/J-8_TSdnMaM

The memory stick tracks are:

Alberto Video A (recorded after workshop): track 26
Alberto Video B (recorded before workshop): track 27

Pedro Video A (recorded after workshop): track 28
Pedro Video B (recorded before workshop): track 29

Sebastiaan Video A (recorded before workshop): track 30
Sebastiaan Video B (recorded after the workshop): track 31

Appendix 10

Results Blind Judge questionnaire for quasi experiment Zutphen Jeroen den Herder

Blind Judge questionnaire for quasi experiment Zutphen
Jeroen den Herder

Name student: Alberto

Please circle A or B:

1.) Which video do you believe shows the best playing in terms of sound production?

(A) B

2.) Which video do you believe shows the best body posture?

(A) B

3.) Which video do you believe shows the best playing in terms of quality of intonation?

(A) B

4.) Which video do you believe shows the cellist playing in the most relaxed manner?

(A) B

5.) Which video do you believe shows the cellist playing with the most physical freedom?

(A) B

6.) Do you have any additional thoughts when observing video's A and B?

A: = unity

B: = separated

Blind Judge questionnaire for quasi experiment Zutphen
Jeroen den Herder

Name student: Pedro

Please circle A or B:

1.) Which video do you believe shows the best playing in terms of sound production?

(A) B

2.) Which video do you believe shows the best body posture?

(A) B

3.) Which video do you believe shows the best playing in terms of quality of intonation?

(A) B

4.) Which video do you believe shows the cellist playing in the most relaxed manner?

(A) B

5.) Which video do you believe shows the cellist playing with the most physical freedom?

(A) B

6.) Do you have any additional thoughts when observing video's A and B?

A: .....

B: .....

Blind Judge questionnaire for quasi experiment Zutphen
Jeroen den Herder

Name student: Sebastiaan

Please circle A or B:

1.) Which video do you believe shows the best playing in terms of sound production?

A (B)

2.) Which video do you believe shows the best body posture?

A (B)

3.) Which video do you believe shows the best playing in terms of quality of intonation?

A (B)

4.) Which video do you believe shows the cellist playing in the most relaxed manner?

A (B)

5.) Which video do you believe shows the cellist playing with the most physical freedom?

A (B)

6.) Do you have any additional thoughts when observing video's A and B?

A: .....

B: ondanks gemiste noot toch beter

Jeroen den Herder: "What I've noticed on the video's after the workshop is that all the cellists we already unified with body and cello before they started to play. You can see on the videos before the workshop that the cellists are trying to give directions from the head. And it stays there, there's no connection between mind and body. There's no trust in believing the body is capable of executing the physical actions which are needed. They do not let the muscle and body memory do its job. That's why I wrote after watching Alberto's video that there is a unity in video A, like a horse and its rider. Everything falls on its place. In the other video you can see that the body and the brain are separated."

Results Blind Judge questionnaire for quasi experiment Zutphen Doris Hochscheid

Name student: Pedro

Please circle A or B:

1.) Which video do you believe shows the best playing in terms of sound production? A

2.) Which video do you believe shows the best body posture? A

3.) Which video do you believe shows the best playing in terms of quality of intonation? A

4.) Which video do you believe shows the cellist playing in the most relaxed manner? A

5.) Which video do you believe shows the cellist playing with the most physical freedom? A

6.) Do you have any additional thoughts when observing video's A and B?

A: *His body posture is much better, but not completely free. Musically it sounds a bit more modest.*
B: *It looks more comfortable since this is his natural way of playing but it actually gives more tension.*

Name student: Alberto

Please circle A or B:

1.) Which video do you believe shows the best playing in terms of sound production?
Marginal difference, maybe A

2.) Which video do you believe shows the best body posture?
A

3.) Which video do you believe shows the best playing in terms of quality of intonation?
Both very out of tune

4.) Which video do you believe shows the cellist playing in the most relaxed manner?
A (slightly)

5.) Which video do you believe shows the cellist playing with the most physical freedom?
A

6.) Do you have any additional thoughts when observing video's A and B?

A: *"He sits more straight, bows better, but still plays very out of tune."*
B: "*He 'dives' into the cello, the left hand isn't smooth."*

Name student: Sebastiaan

Please circle A or B:

1.) Which video do you believe shows the best playing in terms of sound production?
B (at the beginning)

2.) Which video do you believe shows the best body posture?
B

3.) Which video do you believe shows the best playing in terms of quality of intonation?
B except for the mistakes

4.) Which video do you believe shows the cellist playing in the most relaxed manner?
B

5.) Which video do you believe shows the cellist playing with the most physical freedom?
B

6.) Do you have any additional thoughts when observing video's A and B?

A: Better intonation, but there is more tension present.
B: His body posture is much better, but musically it sounds less free.

As you can see, Jeroen den Herder's and Doris Hochscheid's observations are in line with the outcome I hoped for concerning the research.