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Hypermobility and violin playing

How hypermobile joints affect my violin playing

Written reflection within independent, artistic project
The sounding part of the project is: J.S. Bach: Solo sonata in g minor
Fugue, live recording

KMH Kungl. Musikhögskolan

Abstract

In this thesis I have studied how hypermobile joints affect my violin playing and tried to find solutions how to cope with hypermobility.

The purpose is to find tools how to change my left-hand technique so that I can play Bach´s Fugue from the Solo sonata in g minor in my master concert without pain in my 4th finger and without tension in my left-hand. The goal is to find a way to play with hypermobile joints so that my technique will serve the music in the best possible way. The biggest questions are what hypermobility is, how I can cope with it, how to play more relaxed and how to develop better support for my left-hand little finger, 4th finger.

The thesis will first focus more on the theoretical side of hypermobility in order to get better understanding of what hypermobility is and how it may affect a violinist. Then I will get more into the aspects of violin playing and my process.

After this process I noticed that working with hypermobile joints is a lifelong process. In order to have a good left-hand technique while having hypermobile joints it is crucial to have good muscle control and awareness. The most important thing is to find the right tools that work for yourself while trying to cope with hypermobility.

As an attachment there is a recording of the piece.

Keywords: Hypermobility and musicians, hypermobile joints, violin, violin technique, left-hand, changing playing technique

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1 Introduction

Surprisingly many musicians have hypermobile joints. For musicians it can be an asset or liability or even both at the same time. In this thesis I will explore what is hypermobility, how hypermobility affects my violin playing and try to find solutions how to cope with hypermobile joints. Hypermobility has affected my violin playing more and longer than I could have guessed. The idea of this thesis came from the struggles that I have faced in the practise room and from the frustrations I have had while trying to figure out how to play the violin in the most relaxed way possible.

1.1 Aim

The aim of my project was to find solutions to my joint hypermobility and to find tools how to change my left-hand technique and feel no tension. The goal being that I could play Bach´s Fugue from Solo sonata in g minor in my master concert so that my technique, despite the hypermobilty, would serve the music in the best possible way. The focus in this project has been finding ways to reduce the pain in my left-hand little finger and to be able to play without any tension after this process. My biggest questions are what is hypermobility, how I can cope with it, how to play more relaxed and how to develop better support to my left-hand little finger (4^{th} finger). How can I build up muscles in my hand and get a better posture and hand frame?

1.2 Background

My whole master studies have had two goals: to be able to play the violin better and to feel comfortable while playing. During my studies at Royal College of Music in Stockholm my professor has had one mantra “in order to get good sound from the violin the player has to have relaxed feeling”. I have been searching this feeling now for two years. My problem opened up to me during my first year in master studies. I had felt a long time that my left-hand had been feeling stiff. You couldn’t see it that clearly, but I could feel it. I could not get my left hand completely relaxed. When I started to study Bach´s Fugue from Solo sonata in g minor my left-hand little finger became sore and joints of the little finger were hurting while playing. My little finger had been hurting many times before during my studies but never this much. I was wondering the cause of the pain and it all occurred to me when I was visiting an osteopath. He asked me if I knew that some of my joints are hypermobile. Especially my shoulder blades and some joints in my fingers are hypermobile. I was really surprised because I thought that if one has hypermobile joints it means that every joint in the body would be hypermobile. I was wrong. I did some research and figured out that

hypermobility may occur only in some joints and it can vary how hypermobile the joints are. The cause of the pain were hypermobile joints in my little finger. The joints did not have enough muscular support. Also, my whole arm was working too much and making extra effort while playing the violin. This occurred especially in my 4th finger (the left-hand little finger) and caused tension in my left-hand. I started to look for some answers to my problem. It was all about back to basics. To start the journey slowly.

2 What is joint hypermobility?

The term hypermobility refers to increased movement beyond normal range. Joint hypermobility may only be present in some or all of a person´s joints. Some people refer to it as having "loose-joints" or being "double jointed". (NHS inform, 2019.) Hypermobility itself is not a medical condition and many people do not even realize that they are hypermobile because it might not cause any problems. However, some people with hypermobile joints may have symptoms such as joint or muscle pain and may find that their joints are prone to injury or even dislocation. (Versus arthritis, 2018.)

2.1 Structure of a joint

Joints are the areas where two or more bones meet. They are constructed to allow for different degrees and types of movement. Some joints are able to withstand compression and maintain heavy loads, they work as stabilizers. Others are able to create movement, so they work as mobilizers. The structure of the joint varies from very simple to complex. Complex joints are responsible of mobilizing and simple joints are made to stabilize. Most of our joints are made both to mobilize and stabilize. The joints throughout our bodies are surrounded by a flexible, elastic membrane, the joint capsule. The outside of the joint capsule is made of connective tissue, ligaments, which gives support and limit the movements of the joint. Its function is to help provide stability to a joint while still allowing proper joint motion. The inside of the joint capsule is lined with tissue called synovium. Synovial cells secrete the fluid that lubricates the joint and gives nutrition to the cartilage. Cartilage is a type of tissue that covers the surface of a bone at a joint and helps reduce the friction of movement within a joint. The joint capsule must be tight enough to prevent slipping or abnormal movements of the bones. At the same time, it must also be flexible enough to allow full normal motion at each particular joint. (Saresvaara-Virtanen, Ojala, 1993, p. 15.)

2.2 What causes hypermobility?

Joint hypermobility is often hereditary, it runs in families. Women are more likely than men to have hypermobile joints (Versus arthritis 2018.) One of the main causes is thought to be genetically determined changes to a type of protein called collagen. Collagen is found throughout the body for example in skin and ligaments which are the tough bands of connective tissue that link two bones together at a joint. If collagen fibres are weaker than usually, tissues in the body will be fragile and too elastic, which causes loose and stretchy ligaments and joints. This is likely to cause hypermobility in many joints. (NHS inform, 2019.)

Everybody's joints are naturally flexible. Stability of the joint is mainly achieved by the strength of the collagen or strengthening protein in the joint capsule. The elasticity which varies between individuals according to its chemical structure is inherited. Stability for the joint is procured by strengthening the muscles that act around a given joint. Through appropriate athletic training and finding techniques to relax or stretch muscles the range of movement can be restored. It is also probable that the subconscious nerve control to the joints might be altered in subtle ways with hypermobile individuals. (Bird & Knight, 2012, p. 1.)

The second thing is the shape of your bones. A joint is the junction between two bones and the shape of the bones determines how far you can move your limbs. If the socket part of the hip or shoulder joint is particularly shallow, the range of movement in the joint will be greater than usual leading to greater chance of dislocation. This is likely to affect a single joint or a small number of joints. This is not a common cause of hypermobility but is likely to be inherited. (NHS inform, 2019.)

Third thing that can cause hypermobility is muscle tone. Children with joint hypermobility may have low muscle tone. This makes the muscles "floppy" so the child might be able to bend their joints more than usual. (NHS inform, 2019.)

Fourth cause is sense of joint movement, in medical terms proprioception. Proprioception means being able to sense the position and movement of your joints without seeing the position. For example, even with your eyes shut, you should know whether your arm is bent or straight. Some people with joint hypermobility have an abnormal sense of joint movement and can sense when a joint is overstretched, giving them a wider range of movement. (NHS inform, 2019.)

2.3 Joint hypermobility syndrome

The joint hypermobility syndrome means that you are at increased risk of injuries, such as dislocations and sprains. Many people with hypermobile joints do not have any problems, and some people such as ballet dancers and musicians may benefit from the increased flexibility. However, people who have problems with hypermobile joints have usually some of the following symptoms:

- Muscle strain or pain, which occurs especially after hard physical work or exercise. The muscles must work harder if the joints are very supple. This can lead to muscle strain and a general feeling of fatigue. An overuse injury develops in the muscles around the joint even though the pain may seem to come from the joint itself.
- Joint stiffness. Stiffness or tension in the joint may be caused by fluid building up inside the joint. This happens because the body is trying to repair the small amounts of damage that are caused if a muscle or joint is over-stretched. The pain will often feel worse as the day goes on and improve at night during rest.
- Dislocated joints. Sometimes the joint can dislocate, this is most common in the shoulder or the kneecap. Sometimes the soft tissues in and around joints can tear.
- Clicking joints.
- Fatigue or extreme tiredness.
- Recurrent injuries such as sprains. Hypermobile joints are more likely than normal joints to get injured if they are overstretched.
- Neck pain and backache. This can be a problem if your spine is particularly supple and the muscles around your spine are not working to support it correctly.
- Foot and ankle pain. Person may easily twist or strain the ankles, if person has a flat arch to his/her foot that can lead to foot pain, particularly after standing for a long time.

Managing these symptoms may involve treating short-term injuries as they arise. Long-term treatments are planned to manage daily symptoms. People with joint hypermobility syndrome often benefit from a combination of controlled exercise and physiotherapy, as well as additional help to manage pain and to make everyday tasks easier. (NHS inform, 2019).

2.4 Diagnosing joint hypermobility

If your doctor thinks that you may have joint hypermobility, the Beighton score is often used as a quick test to assess the range of movement in some of your joints. This cannot be used to confirm a diagnosis, because it is important to look at all the joints. If you have other symptoms in addition to hypermobile joints, you may carry out a further assessment of your condition using the Brighton criteria, which can help determine if you have joint hypermobility syndrome. (NHS inform, 2019.)

2.4.1 The Beighton score

The Beighton score consists of a series of five tests, the results of which can add up to a total of nine points.

The score is worked out as follows:

- one point if you can place your palms on the ground while standing with your legs straight
- one point for each elbow that bends backwards
- one point for each knee that bends backwards
- one point for each thumb that touches the forearm when bent backwards
- one point for each little finger that bends backwards beyond 90 degrees

If your Beighton score is four or more, it is likely that you have joint hypermobility.

2.4.2 The Brighton criteria

Among the Brighton criteria keep in mind your Beighton score, but also consider other symptoms, such as joint pain and dislocated joints, and how long you have had them. There are major and minor Brighton criteria.

Major criteria

The major Brighton criteria are:

- having a Beighton score of four or more either now or in the past
- having joint pain for longer than three months in four or more joints

Minor criteria

The minor Brighton criteria are:

- having a Beighton score of one to three, or having a Beighton score of zero to three if you are over 50 years of age
- having joint pain for longer than three months up to three joints, back pain for longer than three months, or spinal arthritis

or spondylolisthesis, where a bone from the lower spine slips out of position

- dislocation or partial dislocation of more than one joint, or the same joint more than once
- having three or more injuries to your soft tissues – such as tenosynovitis (inflammation of the protective layer surrounding a tendon) or bursitis (inflammation of a fluid-filled sac in a joint)
- having particular physical characteristics called Marfanoid habitus – this includes being tall and slim and having long, slim fingers
- having abnormal skin, such as thin and stretchy skin
- having eye-related symptoms, such as droopy eyelids or short-sightedness
- having swollen and enlarged veins, a hernia or if you are woman and have pelvic organ prolapse

According to the Brighton criteria, joint hypermobility syndrome may be diagnosed if you have:

- two major criteria
- one major criteria and two minor criteria
- four minor criteria
- two minor criteria and a close relative, such as a parent, who has been diagnosed with joint hypermobility syndrome

3 Hypermobility and musicians

Musicians, like athletes, are prone to musculoskeletal injuries. These injuries can end a career or affect the individual's income, but a successful return to musical career can usually be achieved with appropriate treatment. (Sheibani-Rad, Wolfe, Jupiter, 2013, p. 146.)

There is evidence to suggest that a higher incidence of hypermobility exists in musicians than in the population at large. Its prevalence is between 5% to 25% among musicians. Hypermobility may affect the playing of an instrument in several ways. (Sheibani-Rad, Wolfe, Jupiter, 2013, p.149.) Hypermobility of the hands and fingers can be an asset and is not necessarily a liability but may at times need some care and attention as well as common sense. (Bird & Knight, 2012, p. 6.) Hypermobility can be seen as an advantage in that it adds to the ability and a disadvantage in that injury may be more likely and take longer to resolve. Hand and wrist injuries are particularly common in performers, especially pianists and string players. There has been a study that found a correlation between musicians with hand and arm pain and the presence of joint laxity. Muscle weakness and increased vulnerability of the associated joint can lead to an increased

propensity for the hypermobile musician to develop injuries or chronic ‘overuse’ syndromes. (Butler, 2010, p. 212.)

Larsson, Baum, Mudholkar and Kollia had made a study with 660 musicians in 1993. They suggested that increased laxity may be the result of chronic ligamentous stress in the joints of string, woodwind and keyboard players. Increased laxity would increase the load placed on the thenar muscles to provide dynamic stabilisation which would then lead to fatigue, spasm and pain. Increased laxity can in worst case lead to the development of synovitis or neuropathy. (Sheibani-Rad et al., 2013, p. 149.)

There is also evidence to suggest that hypermobile joints have a decreased sensitivity to proprioception which means that musicians may exert more force than necessary on strings or keys to provide greater security to fingers which increases the possibility of chronic strain (Butler, 2010, p. 212).

Many instruments can be modified to make playing more comfortable and safer. Reducing the load to the musculoskeletal system can have an immediate beneficial effect. There are many ways and adaptive devices to help decrease joint strain and distribute the load of an instrument. For example, clarinet and oboe players can decrease the load on the right thumb by using a splint or a neck strap. End pins have been successfully employed in the bassoon, English horn and tuba. The location of the flute keys can be customized to fit the player’s hand. (Butler, 2010, p. 212.)

The outstanding virtuosity of the violinist Niccolo Paganini (1782-1840) derived from the remarkable flexibility of his joints, and in particular of his left hand. He is reported to have been able to bend his thumb back so far that the thumbnail touched the back of his hand. Paganini was able to extend the fingers of his left hand on the finger board of the violin up to three octaves with little effort, more than other virtuoso players could reach. (Smith, 1982, p. 1385.)
For a long time, there was a belief that Paganini had unusually large hands and long fingers but doctor Martecchini has written about him as followed: “It’s astounding what he can do with it; he can move the joints laterally and can bend the thumb back till it touches the little finger. He moves his hand as flexibly as though it were without muscle or bones”**.** Also doctor Bennati, who had made observations of Paganini, has written: “His hands are not larger than normal, but he doubles their reach by the extensibility achieved in all the parts. Thus, for example, he can impart to the first phalanges of the fingers of the left hand an extraordinary flexing motion which, without the hand moving, supports them in a direction lateral to their natural flexion-all with ease, precision and speed”. (Smith, 1982, 1385-1386.) Hypermobile joints were an advantage to Paganini.

Unlike Paganini hypermobility has been a disadvantage to violinist Chloe Trevor and to guitarist Tomlin Lecklie. Chloe Trevor has talked about her hypermobility on her Youtube channel. She has also made a video about her

hypermobile joints. In the video she shows different exercises which she uses to treat her hypermobile joints. She also tells how she copes with hypermobility during performance and practise sessions. (Trevor, 2014.) Guitarist Tomlie Lecklie has written a blog about his hypermobility syndrome and how he could not play the guitar for six months because his joints were overused. In his blog he wrote that he has used for example Pilates and Alexander Technique as methods to cope with the hypermobile joints. (Independent Living, 2019.)

3.1 Pain while playing

It is not certain why some people with hypermobile joints experience pain. There may be several reasons for this. Pain is the most common primary symptom and is usually described as aching, burning, electrical or pulsating (Sheibani-Rad, et al., 2013, p. 146).
The principal theory is that the pain is caused by an overuse syndrome that is maybe more commonly known among athletes. The hypermobile joint requires exertion of the muscles around it to stabilize it in a firm position before it is moved to play the instrument. With a stiffer joint, already held in the correct place prior to playing, this extra exertion is not required. It is also possible that hypermobile joints collect fluid in the joint when under stress and the pressure effect causes stiffness and possibly pain. (Bird & Knight, 2012, p. 4.)

3.2 Overuse syndrome

The most common problem among musicians is overuse, which represents the culmination of playing past the point of muscle fatigue (Sheibani-Rad, et al., 2013, p. 147). When the muscle is overused and exhausted by continuous and repetitious movement it hardens, tenses and stiffens due to changes in muscle proteins, chemicals and structures, which makes the muscle and joint impossible to move as effortlessly as usual. This might lead to pain after some time. (Szende and Nemessuri, 1971, p. 185-188.)
The most important risk factor is the constant repetition during intense practice sessions. Other risk factors include physical disproportion between instrument and musician, poor posture, increase in playing time, female gender, fatigue and excessive finger angulation. Overuse causes tissues to be stressed beyond their anatomical and physiological limits. Over 50% of professional musicians overuse their limbs with consequent pain. It may occur in the forearm and hand, presenting as weakness, stiffness, lack of dexterity and tingling. (Sheibani-Rad, et al., 2013, p. 147.)

There are two phases in the treatment of overuse syndrome. In the acute phase treatment begins with long periods of rest, ice, short term anti-inflammatory agents and with modification of activity. As the pain diminishes, rehabilitation programme of physical conditions, including

aerobic activity, parascapular strengthening, postural exercises and core strengthening, should be started. Up to 80% of patients suffering from overuse have been reported to respond successfully to this kind of treatment allowing musicians eventually to return to a normal practising and playing schedule. (Sheibani-Rad, et al., 2013, p. 147.)

The muscles of the hand get easily tired. It is crucial that the practise sessions are short and painless. This is the way to ensure that you get results efficiently. It is important that the exercises are made with relaxed body and hands so that extra tension is not occuring. When the hand feels tired it is time to take a break. The body will tell when everything is not right. If the pain continues multiple hours after the practice session it is a sign of overuse or wrong posture. Musicians should remember that the body learns best while it is resting. It is necessary to have compelete days dedicated to rest.

The central nervous system will also get exhausted if there are no needed breaks. The central nervous system controls our sense of touch, vision and hearing. Rest makes it possible for the body to start recovering from the working mode. This is when the metabolism is activated. Regular breaks are extremely important when you practice a lot. The most effective form of resting is a good night's sleep. (Szende and Nemessuri, 1971, p. 185- 188.)

4 Treatment of hypermobility

Hypermobile musicians have to pay particular attention to playing technique. Treatment must focus on muscle strengthening, joint stability, sensorimotor retraining to improve proprioception and patient education regarding healthy joint use. There are also adaptive devices that musicians can get for the instruments. The assessment and treatment of symptoms and dysfunction due to hypermobility should be considered in the context of the whole. (Butler, 2010, p. 207-208.)

If you feel pain in jour joints or around them it is important to ask whether the pain occurs during or after playing the instrument, to know what happens to the pain during playing and whether the symptoms interfere with performance or practice. (Sheibani-Rad, et al., 2013, p. 146.)

It is rear that hypermobility is so sevear that it requires surgery. In general, surgery of the joints is not recommended for people with joint hypermobility syndrome unless it is absolutely necessary. (Versus arthritis, 2018.) There are many other ways to treat hypermobile joints.

4.1 Physiotherapy

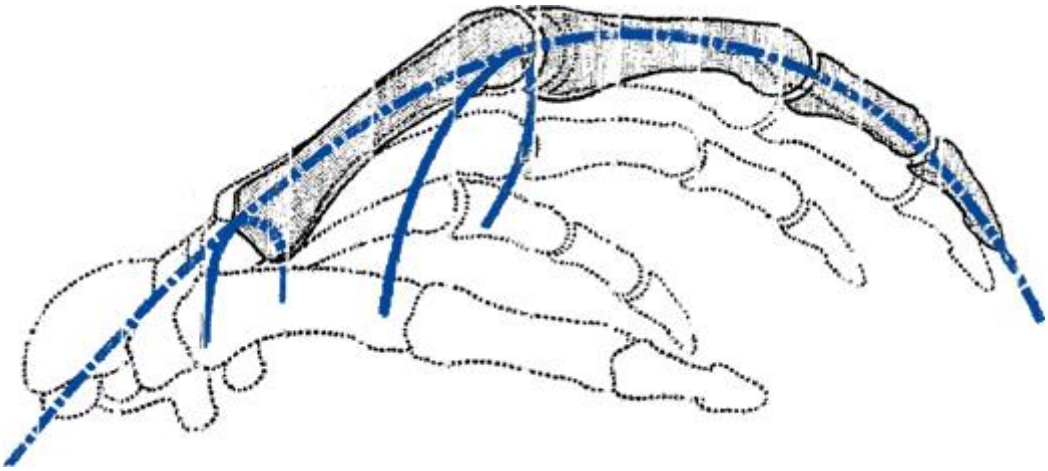
Physiotherapy may help people with hypermobile joints in several ways. For example, it may help to reduce pain, improve posture, improve muscle strength and fitness, correct the movement of individual joints and improve your sense of your body's position and movement (proprioception). (NHS inform, 2019.)

It is important to have a physiotherapist with knowledge of joint hypermobility syndrome, as some physiotherapy treatments can make symptoms worse. (NHS inform, 2019.)

There are many ways of physiotherapy that can be used. You can follow an exercise programme that includes strength and balance training, special stretching techniques and get advice about pacing. Pacing means having balancing periods of activity with periods of rest. The main point is that you are not overdoing or pushing yourself beyond your limits. (NHS inform, 2019.)

4.2 Ideal position of the hand

Best position for the fingers to function is when the wrist is extended 15 degrees and turned 15 degrees towards the little finger, this is called the central position of the wrist. In this position the muscles in forearm, fingers and hand have the best possibilites to function and there is minimalized risk for overstress. The muscles of the hand form essential support for the fingers and wrist to be able to bend and strech. The muscles of the hand are located between the bones of the hand and they extend from wrist until the middle joints of the fingers. The muscles form both transverse and longitudinal arch of the hand. (Porander, 2008.)



(The transverse and lingitudinal arches of the hand.)

There are two transverse arches. The other one is located by the wristbones and the other around the knuckles. The longitudinal arch is formed between the wrist and the tip of the middle finger. The fingers should keep the arched shape during playing. Over extending or over bending joints add stress to the joints and muscles. (Porander, 2008.)

The muscles of the hand should support the whole hand while playing. If the arch of the hand is not controlled, it is hard to press down the strings. There are many different exercises on how to improve the muscle strength of the hand and activate the knuckles and arches of the hand.

4.3 Strengthening exercises for hand

A good muscle condition is a fundamental factor for musicians. It helps musicians to find a comfortable playing position and muscular balance, which helps to find an effortless way of playing (Garam, 1990, p. 28). People suffering from hypermobility can benefit greatly from an exercise programme to improve joint control, muscle power and stamina. Stability exercises in a pain-free range of the muscle is good way to strengthen the surrounding of a joint. Involving a target object can be useful progression to develop isometric strength, where the joint angle and muscle length do not change during contraction, and proprioceptive awareness. A good example is maintaining the neutral joint position while holding a pen. Later, exercises can be progressed to include concentric and eccentric strengthening, where muscles get shorter and longer. (Butler, 2010, p. 208.)

The muscles of the hand are frequently stressed in an attempt to compensate for joint instability. Therapeutic putty -exercises can be useful for specific muscle strengthening and for improving joint stability. The strengthening of the muscles is very important for reducing fatigue of the muscle quickly. It is also encouraged to have short and efficient pain-free sessions of exercise. It is imperative that the exercises are performed with slightly flexed joints, rather than collapsing into hypermobile positions. It is also recommended to use graded rubber bands to assist the strengthening of the hands. (Butler, 2010, p. 208.) I use graded rubber band exercises with my hypermobile shoulder blades. A physiotherapist has given me specific exercises for the muscles around my shoulder blades. I do these exercises every night before going to bed. This has helped me to control my shoulder blades better and has reduced my neck and shoulder pain.

Possibly due to alterations in central and peripheral neuromuscular physiological processes strength gains are slower in the hypermobile musician. This is one reason why it can take many months for stability and strength to improve enough for the musician to be able to perform the task in a modified way. Gradual return to task performance is often required. By keeping a diary or making a practice schedule it is possible to monitor symptoms and control what is tolerable time of exercise or practise session. Strengthening exercises must be continued until sufficient muscle strength has been gained so a neutral joint position can be maintained whilst performing the required task. (Butler, 2010, p. 208.)

4.3.1 Exercises without equipment:

Finnish physiotherapist Katariina Porander, who is specialised in musicians, has written about physiotherapy for musicians and she has also many useful exercises for the hand. The goal of the exercises is to activate and to strengthen the muscles of the hand. (Hoppari, 2014, p. 4-7.)

1. Exercise," The eye"

1. Take a seat at a table and put your hand on the table.

2. Put your hand in the middle position so that the wrist has the angel of 15 degrees.

3. Put the thumb down from its metacarpophalangeal joint, the first joint of the thumb.

4. Move your first finger towards the thumb in a round position. There will form "an eye" when the first finger and the thumb meet.

5. Keep the position and start widening the knuckles away from each other, remember to hold the arch of the hand round.

During this exercise the knuckles of the hand should be seen all the time. Remember to keep the fingers lower than the knuckles. The point of this exercise is to get to know the outer hand muscles.

Remember to shake and relax the hand before you repeat the steps.

2. Exercise

(You can do this exercise also in the air)

1. Put your hand in the middle position so that the wrist has the angel of 15 degrees.

2. Put the thumb down from its metacarpophalangeal joint.

3. Put first finger and little finger down in a straight position.

4. Lift middle finger and ring finger up.

In this exercise it is important to feel the outer muscles of the hand and the muscle arch which is formed between little finger and thumb.

It can be helpful to imagine that a ball would fit in your hand.

3. Exercise," Cup"

1. Put your hand on the table so that the back of the hand is touching the table.

2. Lift your thumb up

3. Lift the little finger up and reach/stretch strongly.

4. There should form a muscle arch between the thumb and the little finger.

The hand should be in a form of a cup so that there could fit a small ball. If the hand is not formed like a cup, try to make room for the "ball" in the hand.

4. Exercise "Dancing fingers":

Put your hand on a hard surface, for example a table, and keep the arches of your hand round. Choose a slow tempo and tap firmly on the surface with the tip of your fingers, the fingers must be round. The goal is to individualise fingers, make neural pathways stronger and learn to control and focus. The following four exercises, where the focus is on the coordination and finding neural pathways, should be done every day for five minutes to get the best result.

a) Choose a tempo in which you want to do the exercise. Take first a slow tempo so that every finger will tap a half note. Tap the fingers on the table in one tempo in following order: thumb, first finger, middle finger, ring finger and little finger. Repeat the exercise as long as tapping movements do not cause any problems. After that you can take two fingers next to each other at a same time. You can also take faster tempo.

b) Do the same exercise as before but do the exercise by alternating first finger and ring finger. When this goes, lift both fingers at the same time. Then it is possible to do variations, for example first finger, ring finger, both, first finger, ring finger both, etc.

c) Next step is to practise with middle finger and little finger. Repeat the previous exercise (b) with these fingers.

d) Last exercise is to lift up first finger and ring finger and hold them up for three seconds and put them down after that. Then change immediately to middle finger and little finger and do the same three second hold.

While I was doing hand muscle strengthening exercises by Katarina Porander I realised that my hand muscles were surprisingly weak. It was hard to activate the knuckles and the arch of the hand muscles. Especially the muscles around my little finger were really hard to activate because I had not used them properly before. With time the muscles got stronger and playing became easier. By activating the knuckles and the hand muscles my little finger got more support and made the hand more relaxed.

It is important to remember that while doing these exercises the muscles will get sore. While changing your technique it is important to take brakes between repetitions and not to do too many repeats during one exercise routine. The muscles and nerves need time to adjust to new positions and movement patterns.

4.3.2 Equipment used in physiotherapy

In addition to strengthening exercises and practising the technique with the instrument there is also equipment that has been developed to strengthen the muscles and to find the right position of the hands.

It is very important to remember that before doing exercises with equipment you must know how to do exercises without equipment. This is to guarantee that you recognise the right muscles that you are going to use.

The muscles need also rest and it is not recommendable to work with the same muscles too hard during two following days.

Theraputty:

Theraputty is a silicone material that can be used for a variety of hand exercises. It is available in different colours which mean different levels of resistance. Theraputty exercises are commonly used in physical and occupational therapy as well as part of a strengthening program. Follow your therapist's instructions closely, as performing these exercises incorrectly or using putty that is too strong may cause injury. (NHS Greater Glasgow and Glyde, 2017.)

Theraputty exercises can be used to strengthen multiple finger muscles. This material can be squeezed together, pulled apart and looped over and around fingers. Start always from softer versions.

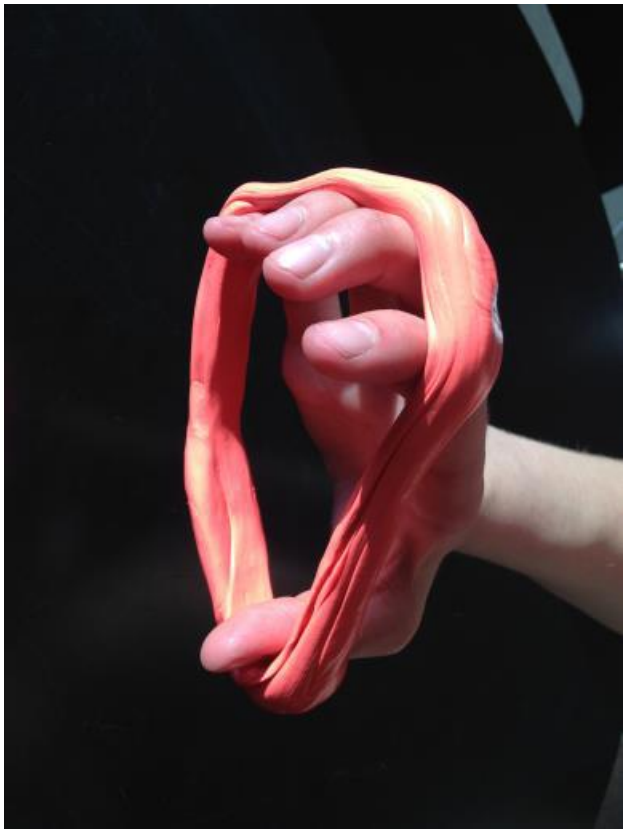
1. Exercise

1. Form a ball from Theraputty

2. Put your thumb under the ball and rest of the fingers above the ball.

3. Squeeze the ball as flat as you can against your thumb by bending your fingers from your knuckles. Fingertips should just lie on top of the ball and be inactive.

2. Exercise

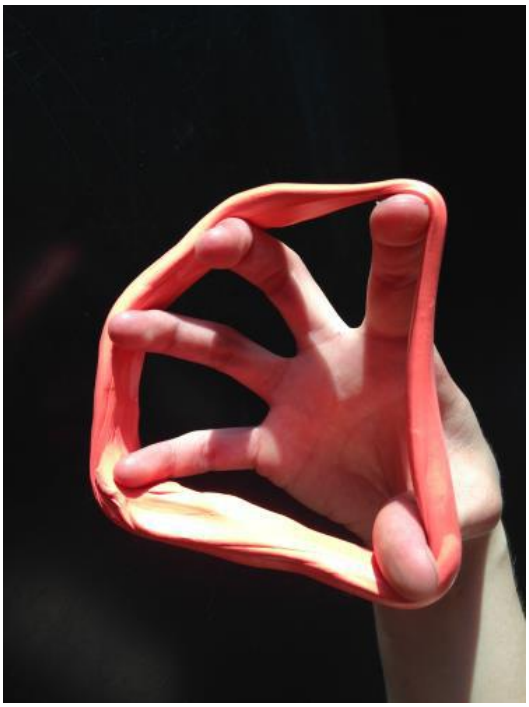


1. Form a circle from Theraputty

2. Put your fingers in the circle so that the thumb is touching the lower part of the circle and rest of the fingers are touching the upper part.

3. Stretch the circle by opening your hand with your knuckles. Your thumb must remain in its position while the other fingers lift up.

3. Exercise



1. Form a circle from Theraputty
2. Put the fingers separately in the circle and put the circle by the fingertips.
3. Make the circle bigger by stretching the middle and last/outer joints of your fingers.

4. Exercise

1. Form a ball from Theraputty

2. Put your hand on a table so that the back of your hand is towards the table.

3. Bring your fingertips roundly on top of the ball and squeeze the ball with your round fingertips.

Handmaster-plus:

Handmaster-plus is an equipment that improves nine muscles that close the hand and nine muscles that open the hand. You can find the ball in different strengths. It is important to start the exercises with the blue ball which is soft and best for the beginners. The red one in the picture is medium strength. (Handmasterplus, 2014.)

Exercise:

1) Put your thumb first in to the strap then other fingers.

2) Bring your elbow against your body and keep your wrist straight.

3) Close the hand and squeeze the ball, then open the hand again. Repeat these movements for 30 seconds.

4) Keep a 30 second break.

4.4 Kinesiology taping

Kinesiology taping is a therapeutic tool and has become increasingly popular. Taping has been used for a long time for the prevention and treatment of sporting injuries, but nowadays physical therapists also use kinesiology taping as one part of an overall treatment. It was developed by Japanese Chiropractor Dr. Kenso Kaze in the 1970's with the intention to alleviate pain and improve the healing in soft tissues. (Grönholm, Salminen, Wegelius & Larsson, 2014, p. 258.)

Kinesio tape is a blend of cotton and nylon. It's designed to mimic the skin's elasticity, so you can use your full range of motion. The tape is also water resistant and strong enough to stay on from three days to three weeks depending on circumstances. (Grönholm et al., 2014, p. 263.)

When the tape is applied to your body, it recoils slightly, gently lifting your skin. It is believed that this helps to create a microscopic space between your skin and the tissues underneath it. It has been proven to have positive physiological effects on the skin, lymphatic and circulatory system, fascia, muscles, ligaments, tendons, and joints. (Grönholm et al., 2014, p. 259–260.)

Many studies indicate that kinesiology taping is most effective when used together with a conventional treatment method. It is always used only with the instructions given by your physiotherapist. There is not consistent evidence that kinesiology taping would work 100%. Some studies indicate no difference in outcomes between kinesiology tape and placebos. (Grönholm et al., 2014, p. 260–261.)

Kinesiology tape can help re-train muscles that have lost function or that have gotten used to an unhealthy way of working. For example, kinesiology taping can be used to correct posture of your fingers. (Grönholm et al., 2014, p. 258.) Musicians suffering from hypermobility may find kinesiology taping helpful for their practise sessions and concerts. With kinesiology taping they can support the hypermobile joints. For example violinist Chloe Trevor, who has become popular via Instagram, has a video on Youtube about how she uses kinesio taping while trying to live with hypermobile joints (Trevor, 2014).

4.5 Proprioceptive retraining

Proprioception exercises and retraining, such as tapping exercises and weight-bearing exercises in a neutral position, should be performed first with the eyes open and then with the eyes closed. (Butler, 2010, p. 208.) For example, first step for a violinist who has hypermobile fingers is to tap fingers to the fingerboard in a good and neutral position eyes open. The violinist should see what the fingers are doing. Next the same tapping of the fingers should be done eyes closed and the same feeling of good and neutral position should be searched just based on how it feels.

After several months of performing strengthening exercises symptoms can improve and it is not uncommon to detect an improvement in ligament tautness. Eventually proprioceptive retraining can decrease the amount of muscle energy exerted to perform the task and fatigue and pain levels can be significantly decreased. (Butler, 2010, p. 208.)

4.6 Ways to protect the joints

- Use joints in a good position. If they are used in the wrong position, such as twisting, extra force is placed through the joint and the muscles are unable to work. This can cause pain and deformity.
- Avoid activities that do not let you change the position of your hand. When you are in one position for a long time your muscles get tired, stiff and pull the joint into a bad position. When muscles get tired the force is taken up by the joint and not the muscles, leading to pain and damage.
- Respect pain. If pain continues for a long time after an activity has stopped, it means that the activity was too much for your joints and should have been changed or stopped sooner.
- Avoid tight grips or gripping for long periods. Gripping tightly may increase your pain. If you grip something that is small or narrow it can require greater power to hold and manipulate it. It is recommended to relax your hands regularly during activities which require gripping, such as writing or knitting.
- Avoid activities that could lead to over-extension. Some directions of force can lead to over-extension at the joints.
- Use one large joint or many joints. Stronger muscles protect large joints so it is better to use- large joints where possible, or try to spread the force over many joints.

  (Butler, 2010, p. 209.)

4.6.1 Self-care

There are ways to affect the joint hypermobility yourself:

- By ensuring that you have a generally healthy lifestyle which includes having healthy eating habits and maintaining a healthy weight. This will help improve the strength of your joints and reduce the strain on them.
- Adopting good sleeping habits if you have trouble sleeping. For example, by having fixed times for going to bed and waking up, trying to relax before going to bed and maintaining a comfortable and quiet sleeping environment.
- Staying as active as you can but sticking to “low-impact" exercises. Swimming and cycling are good examples to help reduce strain on your joints.

- In case of an injury from over-stretching, it helps to rest the joint and elevate it for example by propping it up on some pillows, you can also apply something cold to the injured area, not warm!

  (NHS inform, 2019.)

4.6.2 Warming up

Musicians are putting athletic demands on fine motor musculature and should similarly be "religious" about warming up before practice or performance. Warming up exercises are made to ensure that the muscles and joints are prepared for the practise session. Warming up and cooling down are the best ways to avoid injuries. Stretching, when done right, is also important for the muscles to recover, reduce tension and balance the instability between different muscles.

Warming up means exercises and movements that will prepare the body for the practise session or for the performance. It is important to warm up the entire body before starting a practice session. (Saari, Lumio, Asmussen, Montag, 2009, p. 3.) Unfortunately, this is not common at all among many musicians. The amount of time you warm up depends on yourself and how you feel. Generally warming up should be minimum 15 minutes (Saari et al., 2009, p. 4).

Warming up increases the blood circulation and the muscles start to get more oxygen and energy. Also, metabolic waste starts to leave from the body and the nerve conduction speeds up, making the fingers to respond quicker. In addition, the fluid in the joints starts to flow better making fingers more sensitive. (Saari et al., 2009, p. 3.)

The body temperature rises during warm up and the stretching of the muscles should be short and active. When done correctly, this increases the sensitivity and elasticity of the muscles. A proper warm up also increases the activity of the central nervous system, motoric coordination and concentration. (Saari et al., 2009, p. 4.)

Before my professional studies I did not warm up without the violin at all before practise session. Sometimes during orchestra rehearsals or violin lesson I rolled my shoulders or waved my arms a bit. Mostly warming up meant playing scales for me. After a nerve injury during my bachelor´s I started to warm up properly with the instructions from a physiotherapist. The warm up consists of active movements and active stretching with the whole body without the violin. This part takes about 10 minutes. After that I do some finger and bow exercises with the violin and try to find the balance between my body and the violin, a free feeling. My whole warm up routine lasts about 20-30 minutes depending on the day.

4.6.3 Cooling down

Cooling down means movements and exercises that are made immediately after practise session. It is a very important part of the practise session. Its goal is to reduce metabolic waist from the muscles and recover the muscles closer to their length while in rest. Well done cooling down will get the body ready faster for the next practise session. (Saari, et al., 2009, p. 31.)

Cooling down consists of exercises that are first almost as intense as the exercises during your practise session. The aim is to reduce the intensity gradually to low impact movements so that the blood circulation stays as good as possible and the capillaries stay open. It is recommended to do fast spurts/movements to activate the fast muscle cells to remove lactic acid. Proper cooling down will help to recover the motoric nervous system, removes lactic acid effectively from the muscles and fastens the recovery process. (Saari et al., 2009, p.32.)

Stretching is the best way to recover the sensory nervous system. This helps the body's proprioception to normalise after practise session. The aim with stretching is to relax the muscles, increase elasticity around tissues and to prevent injuries from occurring. Stretching must be done after the active cooling down process. Otherwise the recovery process will slow down. (Saari et al., 2009, p. 32.)

The stretching should last primarily 5-10 seconds and if needed 10-30 seconds per muscle. It is important to avoid stretching that lasts longer. If the stretching lasts longer than 30 seconds the metabolism slows down, and the metabolic waist will pile up in the muscle and weakens the movement of nerve impulses. (Saari et al., 2009, p. 32-33.)

When stretching it is important to avoid extreme positions of the joints. Regular and too powerful stretching can cause hypermobility to a normal joint. The mobility of the previously normal joint will eventually return to its normal state when the stretching has been stopped. If you are really hypermobile, stretching may make the negative symptoms worse than before. Stretching requires knowledge of which joints are hypermobile. (Ylinen, 2006.)

One good example of how stretching can be harmful is about a violinist who complained that her hand was aching all the time and the pain just got worse. She has hypermobile joints which you can see straight away. I had just done research for this project and read about stretching and how it affects the hypermobile joints, so I happened to pay more attention on people who were stretching. I was on the same lesson with her when I noticed that she was stretching her left hand all the time. I told her what I had just learned about stretching and hypermobility. I suggested that she would stop stretching for a while and see if the pain would ease. After two weeks I got to know that the pain in her hand was gone. It seemed that too much stretching had made her hypermobility worse.

Sore and stiff muscles are often a sign of unfinished recovery. If the body does not recover properly it can lead to overuse or even to an overuse injury.

It is important to let the body recover from the practise session. Usually the body recovers properly within 24 hours. (Saari et al., 2009, p. 33.)

There is no specific way to do warming up or cooling down. The musician has to search and develop their own routines and habits which work best for them. Most important thing is to find the right kind of practising routine and consider how to the practising affects the body. (Saari et., al, 2009, p. 33.)

5 Changing my technique / the process

When I realised that my problems occurred from hypermobile joints, I felt relieved. There was now something concrete that I could work with. All these years when I had felt that something was not completely right in my playing had now gotten an explanation. Now the question was how I could improve my playing so that my little finger would not get hurt while playing Bach Solo sonata's Fugue and how I could feel free while playing the double stops and arpeggios in the piece. Hypermobility can cause tense movements to musician and lead to pain in the joints and surrounding muscles. Long lasting false posture can lead to muscle infection/overuse syndrome. In order to not feel tense in my left-hand and get more support to my 4th finger, I had to start from the basics. How I felt in my whole body, how my hand would be in ideal position for the least amount of tension and how I would get the most support for my hypermobile joints. The right playing technique and the capability to control the muscles in the hand form a necessary toolbox for music making. This process of changing my left-hand technique started already during the spring 2018.

5.1 Natural movement and posture of the body

Ergonomic, natural and smooth movement happens first in the mind as a strong mental image (Garam, 1990, p. 16). It is important to have a good proprioception. This means that you should be able to sense the positions and movements of your joints and muscles clearly and recognize the difference between tension and relaxation (Garam, 1990, p. 28-29). The goal is that the gravity effects the body as little as possible and there is a natural feel and speed of the movement so that everything feels easy and free (Garam, 1990, p. 28, 30-31). This is possible if the player has found the ideal posture, which helps with breathing and finding a relaxed playing position. Natural and relaxed posture helps having free movements of the arms, hands and fingers (Garam, 1990, p. 31-32).

Holding the best possible posture needs only the smallest amount of muscle activity (Garam, 1990, p. 34). The body should be able to be in constant natural movement without the feeling off stiffness. (Garam, 1990, p. 34-35.) One really good video about finding your natural positions is on Youtube called With Nicky - Back to Basics. The link to her video is in the references. She has many good tips about finding natural playing posture.

There are various ways to hold the violin and the left hand. The best positions are determined by the anatomical structures of violinists. There is no specification which is exactly the one and only way of holding the violin. The common element which makes all these different ways possible is the freedom of movement. (Garam, 1990, p. 35-36.) Compromises must be made to find the best solution for every player. A person with long fingers might hold left-hand a bit lower than a person with shorter fingers. Most important is to find a natural position for the arms, neck and shoulders. A comfortable and natural posture should make it possible to change the place of the violin on the shoulder while playing instead of being fixed into one position. (Garam, 1990, p. 35-37)

My former teachers have pointed out that I tend to lean too much downwards while playing. This false posture creates more tension to my body and does not allow the muscles to support my body the right way. Instead of leaning downwards I should raise my violin and open my posture with widening my shoulders so that I would get a relaxed feeling. My teacher professor Cecilia Zilliacus says always that violin playing should feel relaxed and that all can be heard from the sound that you produce from your instrument. She also could see straight away if I was tense. A healthy technique which does not cause injuries is a result of comfortable positions and natural movements of the muscles and joints. This leads to good and healthy sound and relaxed technique.

5.2 The 4th finger

Usually it is instructed that the left-hand little finger (4th finger) should be round from every joint. For me this does not apply that well. My little finger is significantly shorter than my other fingers which makes it really hard to find a position where I could get the middle joint of my 4th finger round. In August 2018 I had a master class with violinist Eszter Haffner. I asked from her about my 4th finger position, because her 4th finger was also straight while she played the violin. She looked at my hand and said that the round 4th finger is not necessary, it is more about the angle of the hand in relation with my violin. The hand should be in 90-degree angle in relation with the violin and then I should pull my hand and wrist a bit away from the neck of my violin. This way I could get better control to my finger and my joints would not hurt that much. It is important to get the whole arm, hand and wrist in the right position so that the fingers are able to land on the string as firmly as possible.

The 4th finger (little finger) is usually the least used and weakest finger in daily basis. The 4th finger position is related to the position of the whole left-hand. I had to start from the basics of my left-hand position to be able to correct completely the position of my 4th finger and to get support from the other fingers.

5.3 Slow practise

Garam (2001, p. 81-84) emphasises the slow and patient building of the violin technique. When changing technique, it is important not to do too many exercises at once and not for too long. The efficiency of practicing is more important than the duration of the practise session. Famous Finnish viola pedagogue Pirkko Simojoki described at her lecture in 2014 that a good practising pattern consists of three parts: analyse, fix and repeat then glue to the system. It is also important to have breaks to avoid injuries. In order to fix your playing technique, it is good to remember to practise small amounts at a time, many times a day and always make the exercises correctly.

Good practising is the key when changing technique or playing position. Everything during the practise session should be well organized and well thought through. In the beginning practising should happen only in a slow tempo. The importance of slow tempo and patience cannot be emphasized enough. The mind must be completely focused in practicing. The player should be able to control every movement in a relaxed and calm manner. The goal is to get the movements so automatic that the result would be free, effortless and natural. (Garam, 2001, p. 85-88.) Slow tempo exercises have to be continued until the muscle force has reached the point where the joint does not collapse outside the practise room, for example while performing in public or being nervous at an exam. The musician has to retrain the proprioception. First you have to practise eyes open so that you can see the movement of your fingers and then repeat the same exercises eyes closed and rely only to your proprioception.

Garam writes also that the mind must stay calm and the sense of the performance should always feel "slow" while increasing the tempo. This means that even though the final tempo would be really fast the mind should always think and feel that everything is under control and there is time to focus and to prepare for the upcoming part. (Garam, 2001, p. 85-88.)

By practising slowly and having control the player can achieve a technique, where there is the least possible amount of tension, the playing consists of elasticity and simple movements and there is no waste of energy. This will be the foundation for avoiding injuries. (Garam, 1972, p. 24.) By having the right kind of technique, it is possible to play as long as you want and not having the risk of injuries.

5.4 Controlling the hypermobile joints

When changing the technique one of the most important things was not to let my left-hand finger joints to collapse while playing. My ring finger and my little finger joints have tendency to lock into a straight position while playing in the upper positions instead of being round. The position of the whole left arm and hand is crucial for the fingers to function properly. While practising new finger trajectory it was important to practise the

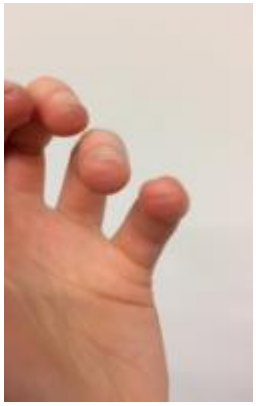
correct movement as a whole and not to pay attention only to the dislocating joint.

I started from scratch. I played only basic one octave scales slowly and concentrated on one finger at a time. I should feel the weight of every finger and have the feeling that my finger goes into the string and it would be active. The hand should have the minimum amount of tension and the feel that the hand is hanging and relaying on the violin (Garam, 1972, p. 24).

Next step was that while playing the scales and having weight on my fingers I should be aware of the upcoming finger. When I knew which note/finger would come next, my hand relaxed and the intonation was instantly better. Everything was still played slowly to achieve the desired minimum state of tension (Garam, 1972, p. 24).

5.5 The angle of the fingers

In November 2018 I wondered how I could get better sound quality with my 4th finger while playing Bach´s Fugue. The problem was especially when I had to play 1st finger and then reach to 4th finger. During this practise session I realised that I was pressing a lot with my 4th finger and that my 4th finger was pulling inwards to my hand, which is the wrong direction. Yehudi Menuhin has written in his book Six Violin lessons (1971, p. 62) “it is important that the angle of the finger in relation to the string lets the cushion of the fingertip to touch the fingerboard evenly from both sides”. My fingertip was touching the string only from the outer part. The fingertip or the ”cushion” should have been flatter and even while touching the string. When the finger was pulling inwards, I could not get support from my hand muscles. Instead the joints of the finger tried to compensate and got overused.



When the finger is in the right angle in relation with the string the mark of the string forms in the middle of the fingertip or “cushion”.

During my master studies my teacher professor Cecilia Zilliacus said words that made me think of this more, "you have good intonation but somehow it is not relaxed, and it does not sit properly, some small adjustment is missing”. I also felt that my hand was not relaxed, and I had never felt

comfortable with my left hand even though everything was basically in tune. My professor Cecilia Zilliacus pointed out that my fingers were possibly too round on the string which lead to the situation where I lost the feeling of continuity between my fingers and my hand muscles which lead to tension. She suggested that my left-hand fingertips could be in more flat position. Changing the angle of my fingertips helped me to reduce the pressure on my fingers and my left-hand felt already more relaxed. I could now feel the control in the whole hand. I had compensated my weak muscles in my little finger by using too much force and energy in my whole left hand. I started to play different fingering exercises and having focus in my 4th finger position and having flatter fingers. It took two years to change my left-hand position so that I could get more "flat fingers". Changing the posture of my left hand changed also the muscle balance in my hand making it possible to get better position for my 4th finger and to be able to play with better sound.

5.6 Hand frame

I got an exercise to improve the hand frame and to get more independent fingers in my left-hand when attending a violin masterclass during summer 2018 with violinist Minna Pensola. The exercise is all about getting independent fingers in the left hand and increasing muscle strength in the left-hand by having independent fingers and relaxed hand. Its idea is to start to play a scale up in the first position through all the strings and after you have played the fourth finger on the E string you go to second position and play a scale down in second position through all the strings. When you have reached the first finger in the G string (note b or b-flat) you go to the third position and play a scale up again and repeat these up and down scales until you are in the highest position possible. Every note should be with vibrato and have connection to the next note, like a bridge between the fingers, and every finger should have a feeling of “a sandbag” transferring from one finger to another. This exercise also activates the elbow and should help with the left-hand posture.

In September 2018 I went to listen to a concert where I heard a violinist who had a fluent left-hand double stop technique. Double stops have always been difficult for me. I have always had trouble to find a relaxed feeling to my left-hand. This was also emphasised when I was practising the double stops and accords in Bach´s Fugue. My left-hand was instantly a bit tense in double stops, and I could not increase the tempo after certain point. I started to wonder what made a difference between me and the violinist at the concert. After the concert I was in the practise room watching my left-hand from the mirror while playing. It was then when I realised that my hand frame changed a lot when playing in the higher positions and my fingers became too straight because the joints collapsed instead of being in a rounder position.

Practising double stops or anything else should always be started with the minimum amount of tension. The movements of the hand should be light and small. Garam writes in his book The Basic Questions in Violin Playing (1972, p. 25) that a violin virtuoso plays so that he/she has always comfortable and pleasant feeling in the arms and hands. The player does not use more energy than needed, it seems even lazy. The player starts always practising with small, soft movements and with quiet nuances. Little by little the virtuoso increases the amount of volume and differences between nuances.

I noticed that by playing first only octaves slowly from low positions to high ones I became more aware of my hand movements (proprioceptive awareness). One exercise that helped also was that I started playing octaves first from really high positions and tried to find a relaxed position before going downwards in the scale. My hand frame started to feel more secure in couple of weeks. After a while I started playing thirds in a slow tempo. After some months the double stops started to feel more comfortable and eventually, I could play double stops also fast without extra tension.

5.7 The power of words

Hungarian violinist Kato Havas, a child prodigy and a ground-breaking violin pedagogue who revolutionized the method of teaching the violin, writes a lot about the power of words (Garam, 1984, p. 144-147). In the end the body and the mind cannot be totally separated (Havas, 1973, p. 16). The mind affects the tensions of the body subconsciously. The power of the mind should not be underestimated (Havas, 1973, p. 96-101). Emotional tension in stressful situations can cause muscular tension (Norris, 1993, p. 24). Havas mentions that a person might have the right kind of movements but might not still be able to let go of the tensions in the body. This depends a lot from the individual. Havas used methods where words had an important role for the player to be able to get a strong relaxing feeling. She used words like ‘rest’, ‘swing’, ‘curl’, ‘flow’ and ‘release’, which have more positive and relaxing effect to the mind instead of words that tend to create static images causing tension, for example ‘hold’, ‘grip’ and ‘press’. (Havas, 1973, p.96-98.)

After I read about this, I started to think more about the power of words. My violin lessons were in Swedish and my native tongue is Finnish. I was now wondering how I actually interpreted the instructions of my professor Cecilia Zilliacus. I realised that when she was asking from me in Swedish to have relaxed feeling, she actually meant that I should feel free. Even though I speak fluent Swedish it did not mean that I would think the same way of all the words. Almost one year before my exam concert, where I played Bach´s Fugue, I wrote on a piece of paper words "feel free" and placed this paper in my violin case so that every time I opened my violin case or put my violin back in it, I would remember to feel free, instead of feeling tense,

when practising. I tried to affect the control of my body in subconscious way.

5.8 Finger pressure

The pressure of the fingers on the fingerboard have a very important role in the violin technique. It actually does not require much force to press the finger on the string. It is more about control of the muscles, accuracy and speed which makes the technical challenges and need the most training. (Szende and Nemessuri, 1971, p. 17-18.)

Using too much finger pressure effects playing the violin in many negative ways. Fast passages become more difficult to play, the hand loses elasticity, it is difficult to spread and stretch the fingers, it becomes hard to feel the vibrations of the strings and to have independent fingers and there might be chronic intonation problems. (Flesch, 1934, p. 11.) In my case I used too much finger pressure in my whole left hand while trying to compensate the lack of control in my muscles and joints. My little finger was always placed too low because of the lack of control in my hand muscles, leading the 4^{th} finger to pull too much inwards. The stiffness and excessive pressure of the fingers had also a great impact on my vibrato. I could not make my vibrato faster and more concentrated. The rigidness of the left hand blocked the freedom of vibrato (Flesch, 1934, p. 11).

It is important to learn the ability to regulate finger pressure and find a way to have flexible, sensitive and adjustable fingers. Muscular activity is needed only when you need energy to counteract the force of gravity. (Garam, 1990, p. 47.)

5.9 Active fingers

Violinist Nicole Benedetti left-hand exercises changed everything. A video called ”With Nicky - Back to Basics -Left Hand Part 1” combined with my own professors instructions, mentioned earlier, made everything to "click" in my head. Now I understood what I had been doing wrong. I had been looking for good posture so madly that I had forgotten the most important thing: how everything feels. I realized that I have to find this free feeling in my hands to be able to play as easily as possibly with no more extra strenght or pressure. I stopped myself from forcing to do something and went with the feeling instead.

Garam (1972, p. 72) speaks about relaxed activity which means that the player is ready to react with elasticity and by having the feeling of relaxed muscles at the same time. Energy is mostly needed to lift the fingers from the string instead of pressing them down (Szende and Nemessuri, 1971, p. 55). Lifting the fingers should be a reflex. Best way to describe it would be

that the fingers bounce off from the string like from the trampoline or from a hot surface.

I started to search bouncy fingers and relaxed activity with the following exercises:

First exercise is done by dropping fingers, all at the same time, on the fingerboard and then letting them naturally bounce off the string like it was a trampoline. This can be done also when holding the violin as a guitar or just dropping and bouncing the fingers on top of a table to find the correct feeling. The most important thing in this exercise is not to use any other muscles but the ones that you need to move the fingers (the arch of the hand and the muscles around the knuckles).

Second exercise is done with the same muscles but now tapping only one finger at a time against the fingerboard. The other fingers must be passive and relaxed until it is their turn to move. If the finger does not easily bounce back after dropping it on the string or table, it is not relaxed enough, and the movement is not reflex-like enough. This relaxation technique has helped with Bach and other pieces, especially in fast passages to avoid the stiffening of the hand.

Third exercise is to play first exercises from The School of Violin Technique Book I by Schradieck. I started playing them very slowly by lifting every finger with a reflex-like movement from the string immediately after dropping them, not leaving them on the string, but placing one finger at a time. Here one must remember not to use too much force, only enough to hear the note. The bow has to be very light and the focus has to be only in the left hand. The fingers must be independent and as free and separated as possible. When changing the finger, there should be a feeling of a bridge between the two fingers. The movement is ‘a throw’ from the base joint and the fingertip must be sensitive and weightless (Havas, 1985, p. 31).

Lifting the fingers helps to make it easier to feel more independent fingers. At the same time, it is important to remember the feeling of the previous stages and pay attention to how much pressure is necessary to make the note sound. Everything happens in a very slow tempo. Tempo can be increased step by step when the effortless feeling has been achieved. In the end there is no time to think every finger independently, but to feel the weight transferring between the fingers. The goal is to get the fingers move while they are actively relaxed.

These exercises helped me to realise the meaning of actively relaxed fingers and helped to find the arches of the hand also while playing. After doing these exercises for couple months I started to slowly practise Bach´s Fugue with the same kind of technique. Whenever I felt a bit tense, while practising Bach, I took a break, took the hard place slower and tried to find the actively relaxed fingers. It took many months so that the new technique would sink in and stay as the new normal.

6 Discussion

During this process I have learned a lot about hypermobility and how it affects my body. I found out that I am not severely hypermobile and that only some of my joints are hypermobile. I have the following symptoms which are common for hypermobile joints: muscle pain in my back/neck because of my hypermobile shoulder blades, joint stiffness especially in my hands, fatigue in my little finger and clicking joints. The hypermobility is in my case inherited. My grandfather could bend his thumbs so that they touched his forearms. My brother can do the same with his thumbs and his shoulders have dislocated multiple times.

After this process I have become more aware of how my practicing habits might affect my hypermobile joints. Before this process I had been too focused on analyzing my hand positions instead of focusing on how everything feels in my body. The feeling of not being able to control my hands 100% had more impact on my violin playing than I had thought. Proprioceptive retraining, especially the tapping exercises, helped me to find the feeling of control to my hands. The exercises to find the muscle arches of my left hand helped my proprioception the most. I still do the tapping exercises and intend to continue them.

I have also become more aware of the length of my practice sessions. Taking enough breaks is necessary for the body to recover and to function in the best possible way. I realized that during the past years I had not given my body enough time to recover properly. My normal practice routine was to go to school early in the morning, practice the whole day with some bigger breaks and go home late in the evening. I slept too little and I practiced a lot. When I started to change my left-hand technique, I also started to schedule the breaks during the practice session so that I could not overuse my joints. It was a big challenge for me to schedule the breaks. Sometimes I failed to keep the breaks even though I had set an alarm. Usually this happened if I had a lot to prepare in short time. After I started to change my left-hand technique, I made sure that my body had enough time to recover properly after my practice day. I slept at least seven and half to eight hours per night and tried to dedicate one day per week just for rest. One rest day a week made a huge difference. After the rest day my whole body felt more relaxed and my fingers responded better to quick movements.

In order to find best ways to cope with hypermobility it is important to know which joints are hypermobile. There are multiple ways of treating hypermobility: with or without equipment, with the instrument, low-impact exercise and rest. I found out that the best ways to treat my hypermobile joints were proprioceptive retraining, exercises without equipment and exercises with the violin. I am still doing the same exercises to improve my hand frame.

The whole process has changed my way of playing the violin and the way I work with my body. I have started to listen more to my body, and I am more efficient when I practice. If I would start the process now, I would focus even more to the hand frame and try to find more examples and exercises to develop it. I would also consider trying Alexander Technique as a method of learning to move more freely and to identify harmful habits.

I was surprised how common hypermobility is among musicians and how little information there is about musicians who suffer from the negative symptoms. I know many musicians, especially string players, who have hypermobile joints. But there is only very little discussion about hypermobility among the musicians. The reason for the lack of discussion might be the lack of information within the music education. During my studies hypermobility was never mentioned or even considered as the source of some of the problems that I had with my playing. In my case the hypermobility is not so visible that the teachers might have even considered it as an option. During my bachelor´s studies I had problems because of my shoulder blades. I was lucky that my teacher was really understanding and wanted to help me through this struggle. I met a physiotherapist who gave me exercises with rubber band to strengthen the muscles around my shoulder blades. I also got some instructions how to warm up without the violin. Even though I got good instructions there was no further discussion about the possibility of me having hypermobile joints. I was lucky that during the first year during my master studies I happened to see a physiotherapist because of my neck pain. During this visit I ended up talking about my left-hand problems and the physiotherapist pointed out if I knew that I had hypermobile joints.

As a violin teacher and a violinist, I hope that the information about hypermobility would spread and reach the people who have problems because of the hypermobile joints. Luck should not play any role when a musician has problems because of hypermobility. It would be important that the teachers would have enough knowledge about hypermobility and that they would be able to recognize and help students with hypermobile joints.

7 Conclusion

Overall result has surprised me. Even though I started to explore hypermobility and its effects only because I wanted to know how I could play Bach´s Fugue without tension and pain, this project has significantly changed everything in my playing. Best way to describe how others have noticed my improvement is that in April 2019 I was playing Mozart D-major Violin concerto after four months break with the piece at my accompaniment lesson. After the first playing time my pianist asked from me what an earth had happened to my playing. It sounded like completely different person would play the piece than me when he last had heard me playing it. I could feel that my playing had become more relaxed and most importantly free. I could trust my hands now. They were not nearly as tense as they had been since I started changing my left hand technique and exploring the possible solutions to my stiffness and pain. Also, my fellow "classmates" had noticed this change.

In my exam concert, May 2019, I started with Bach´s Solo sonata in g minor with parts Adagio and Fugue. I was surprised that when entering the stage I was not almost nervous at all. The calmness inside me was something completely new. I was not worried about my hands, my little finger was not hurting, I did not feel tense and I was not shaking from my hands like before. Instead I was conscious of every note I was playing. My whole body felt free and I could just make music, enjoy and give the audience the interpretation that I had in mind. The timing could have not been better. I had worked my way from struggling and almost crying in the practise room, because I could not understand why my little finger was hurting, while practising Bach, to this moment on stage where Bach´s Fugue felt enjoyable on stage for the first time in my life. All the factors that I had been working with during this process came also together as better tone production and tone quality, in other words better sound.

I am really happy that I started to investigate my hypermobility and how it affects my violin playing. It has been a long and sometimes frustrating one and a half years. I have learned tremendously about violin playing and from myself. To be more specific, how I practise and how I have to work to achieve the best possible results. Looking back this journey has made me a better violinist and also in the future hopefully a better teacher. I feel that I now have wider knowledge of hypermobility, I know how hypermobility affects my playing, how to deal with it in daily basis and how I can help future students if they are suffering from hypermobile joints. This work got its idea from my problems with Bach´s Fugue in g minor but it effected my whole playing, technique and capability to interpret the music. Violin playing consist of many parts and when everything clicks, the puzzle comes together. This journey is certainly not over. Hypermobility cannot be cured, you can just find ways to live with it and learn to handle it in the best possible way. I hope this master thesis will help other musicians who suffer from hypermobility and try to find solutions to their problems.

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