RELEARNING MOVEMENT

AN INVESTIGATION ON STRATEGIES SUPPORTING THE PREVENTION AND REHABILITATION OF PERFORMANCE-RELATED MUSKULOSKELETAL DISORDERS AMONG HIGH-LEVEL ACCORDION PLAYERS

Seminar Thesis
May 2020

Teacher's Pedagogical Studies
Sibelius Academy of the
University of the Arts Helsinki

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Title of the thesis or written presentation	**Number of Pages**
RELEARNING MOVEMENT; AN INVESTIGATION ON STRATEGIES SUPPORTING THE PREVENTION AND REHABILITATION OF PERFORMANCE-RELATED MUSKULOSKELETAL DISORDERS AMONG HIGH-LEVEL ACCORDION PLAYERS	47 pages
Author's name	**Semester**
Frin Wolter	Spring 2020
Department	
Department of Accordion, Kantele and Guitar	

The purpose of this research paper is to investigate strategies that support the prevention and rehabilitation of playing-related injury among high-level button accordion players. Strategies of that kind were found in teaching and performance practices of the accordion, but also in specifically tailored exercise programs for musicians that are based on the theory of spiral stabilization (SPS). Spiral stabilization is a therapy method that uses various equipment, especially a long rubber band, to exercise postural stability, balance, mobility, and coordination by training the lengthening muscle chains of the body.

In this study, the data was generated through a series of qualitative interviews. The participants' experiences and knowledge of the problem at hand gave crucial information to assess the importance of several factors that prevent and rehabilitate PRMDs and are connected to the acquisition of body awareness and healthy movement. The results indicate that understanding concepts of physics and anatomy, smart training and hard work, intelligible and factual instruction are key to the prevention and rehabilitation of PRMDs. The study concludes that there are a variety of sustainable strategies in teaching and instruction that help the prevention of PRMDs, but that general occupational injury, including PRMDs, could be caused by a larger societal issue linked to increasing physical inactivity of people.

Keywords
Accordion, spiral stabilization, injury, prevention, rehabilitation, body awareness, pedagogy

The thesis has been checked for originality using a plagiarism prevention service:
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Acknowledgments

I would like to express my very great appreciation to Dr. Danielle Treacy, my research supervisor, for her patient guidance, responsiveness, enthusiastic encouragement, and helpful advice throughout the research process.

My special thanks go to Hely Järvinen and Mika Väyrynen for sharing their knowledge and expertise in the data generation process. Without their engagement, this study would not have been possible. My great appreciation goes to Tiina Arrankoski, who brought Spiral Stabilization to Finland and has been helpful to provide me with source material on the subject during the COVID-19 crisis.

Finally, I wish to thank my friends and family for their support and encouragement. Many thanks go to my partner Ezgi for her love and patience, and for providing me with delicious home cooked food during my writing sessions.

1. INTRODUCTION

While studying the accordion at university level for several years, I have met numerous colleagues suffering from performance related musculoskeletal disorders (PRMDs). Throughout the years, I had as of myself my own share of experiences with PRMDs and had almost accepted them as part of my life as a musician. Sharing these experiences with my peers made me realise that I was not the only one having trouble with pain while playing my instrument and discovered that a vast majority of musicians deal with PRMDs throughout their life. I observed that many consider surgery as the ultimate solution to their pain, but I realised that medical advice is often only partly effective in curing pain and injury. Ever since I have been searching for ways to feel more comfortable with my instrument. Over the years, I got more and more convinced that there are pedagogic and therapeutic solutions for most musicians that help to be at ease with their instrument.

Many studies agree that generally musicians are vulnerable to musculoskeletal disorders (e.g. Aparicio et al., 2016; Chan et al., 2014; Iannou & Altenmüller, 2015; Silva et al., 2015; etc.) with most of these studies focussing on specific instrument groups or musical environments such as music schools, universities or orchestras. All these studies agree that instrumental practice at a high level is accompanied by certain health risks. I would assume this applies to accordion as well, even if there has not been much research about high level accordionist's performance-related musculoskeletal disorders (PRMDs) specifically. The purpose of this research paper is to investigate strategies that support the prevention and rehabilitation of playing-related injury among high-level button accordion players.

In this study, I first review the currently existing literature about occupational-injury studies, studies about prevention and rehabilitation, risk factors for developing PRMDs and the research around accordion and PRMDs. In the theoretical framework chapter, I explain the theories which the study relies on. The fourth chapter outlines which methodology and methodologic process were used to conduct this research. The findings chapter objectively presents the obtained results which are further on discussed and interpreted in the discussions chapter, followed by the conclusion, source references and Appendixes. The purpose of my research is to investigate the reasons for high level accordionist's PRMDs and what strategies exist to prevent or rehabilitate them.

1.1 Context

At the Sibelius Academy of Helsinki, learning the playing technique required for the performance of technically and musically demanding concert repertoire stands at top of the curriculum for accordion studies. Among the teachers of the Sibelius Academy, I wanted to interview one personality, Mika

Väyrynen, who has a unique and personal approach to the instrument, on a technical and ergonomic as well as artistic level.

Until today it has been difficult to create a comprehensive and complete theory about how to play the accordion. The instrument itself is still evolving because it is “new”, compared to other classical instruments such as the violin which has found its final standardized form about 400 years ago. The form of the classical performance accordion has been partly standardized only recently, and there are several forms of folkloric instruments that are part of the “accordion family” such as Bandoneon, Concertina, Diatonic accordion and many more. I want to precise that this study focusses on classical button accordion and not on similar aerophones or the above-mentioned folk music instruments, since the anatomy and playstyle of these instruments are very different. Classical button accordion differs from other accordion types by its great dynamic and keyboard range, the volume and weight of the body and the variety of challenging repertoire written for it. Also, contrary to other accordion types it is played while sitting.

In the last decades, many music institutions have been trying to find ways to improve musicians’ wellbeing by offering courses to inform about playing-related injury, healthy behaviours, health literacy and various strategies to acquire body awareness. They include yoga classes for musicians, Alexander technique, Feldenkrais and interventions by physiotherapists among others. The pool of possibilities for musicians to engage into healthy strategies is increasing, but the lifetime prevalence of PRMDs is still an issue. Therefore, I will highlight in this study a new kind of exercise program designed for musicians which is based on Spiral Stabilisation method.

2. LITERATURE REVIEW

In the last 20 years, a lot of research has been done about performance-related musculoskeletal disorders (PRMDs), about risk factors and about prevention and rehabilitation. But still, little has been done to understand the origin and the nature of accordionists' PRMDs. Many studies have been conducted with orchestra musicians or specific instrument groups (strings, winds, piano players) which are focussing on the type and origin of certain injuries. Other studies have focussed on researching ways to improve the prevention and rehabilitation of PRMDs among musicians. In the journal MPPA (*Medical Problems of Performing Artists*), the editor Manchester (2014a) identified a lack of studies about PRMDs in the field of keyboard instruments other than the piano (Manchester, 2014a, p. 55).

2.1 A Culture of suffering and poor health education

Accordion players are far from being the only instrumentalists suffering from PRMDs. Baadjou et al. (2019) found that several studies combined revealed that more than 80% of musicians have experience with PRMDs in their life, and suggest that there is a need to do further research on factors that contribute to pain and strategies that reduce the risk of contracting PRMDs.

To understand PRMDs we need to have a look at the culture musicians live in. Being a musician requires many hours of daily practice, accompanied by high job competitiveness and personal high-level expectations, which leave a print on most musicians' personalities that make them push harder to obtain better results.
Injury and pain may get in the way of their expectations and many musicians do not know how to deal with it. Iannou and Altenmüller (2015) describe the musicians' profession as highly demanding physically and mentally, and name a variety of problems musicians are typically confronted with:

> Musicians frequently suffer from various mild or severe musculoskeletal disorders, peripheral nerve problems and focal dystonia (also known as musicians cramps), extensive practicing overuse, instrumental constraints, posture abnormalities, inappropriate/"poor" technique, stressful psychosocial constraints (e.g., performance anxiety), previous injuries, age and genetic predispositions […] these are some of the risk factors contributing to the development of PRP [Playing-Related Pain] disorders. (Iannou and Altenmüller, 2015, p. 135)

According to the same study, the rates of music students suffering of playing-related pain is considerable:

> […] Of these [instrumental students], 88,9% reported that they had experienced PRP at least once in their life, with 12,6% of them experiencing pain every time they play. […] An alarming 35% of affected students tended not to seek help at all. (Iannou and Altenmüller, 2015, p. 135)

This shows why it is important to improve pedagogical approaches and student support strategies to tackle injury in the early stages and arm the future musicians with the tools to stay healthy for their career ahead.

Baadjou et al. (2019) found that many studies suggest that the health literacy of musicians and their ability to good decision making for healthy lifestyle choices is generally poor. (Baadjou et al., 2019, p.105). In order to help musicians durably, several studies suggest creating education measures and initiatives that affect individual behaviour and attitudes towards health education in music institutions, conservatories, universities and orchestras. (Baadjou et al., 2019; Rickert et al., 2019; Silva et al. 2015)

A study in three parts about injury in the orchestral environment by Rickert et al. (2014) suggests that injury is still a taboo among musicians, even on a professional level:

> […] an orchestral culture exists in which musicians see injury as a sign of weakness, failure and poor musicianship. Such negative perceptions of injury influence musicians to play through considerable levels of pain and continue performing with injuries. (Rickert et al., 2014a, p. 94)

This enlightens us on the situation many musicians with PRMDs face. The same study revealed:

> Injury concealment played a considerable role in the development of chronic injuries for these musicians and management staff felt that this concealment may be the norm amongst orchestral musicians. (Rickert et al., 2014b, p. 125)

2.2 A need for healthy strategies to prevent and rehabilitate PRMDs

A study by Vervainioti and Alexopoulos (2015) revealed that in Europe job related stressors carry an important burden on the economy. Logically, searching for ways to reduce risk factors of contracting PRMDs is not only beneficial for the musicians, but also of direct financial interest for cultural institutions. Other studies focus on the prevention and rehabilitation of musician's PRMDs. Some transfer knowledge from other fields of study, such as occupational injury therapy (movement therapy), others focus on the design of exercise programs tailored for musicians' needs. Manchester (2014b) states that in the field of occupational medicine it is recognized that the lack of postural stability has an important impact on the development of work-related injuries.

In the field of occupational injury studies, it has been argued that sitting habits greatly influence the musculoskeletal system. Awkward sitting habits may start at early age and could be a major factor for children to develop musculoskeletal disorders (Syazwan et al., 2011, p. 287), which may bring a variety of discomforts throughout adult life. It is also common knowledge that physical activity in opposition to static activity plays a crucial part in the development of children's musculoskeletal system, motoric skills, and body awareness.

A variety of studies in the field of PRMDs show that specifically tailored physical exercise programs for musicians have a positive impact on PRMDs. Araújo et al. (2020) found that this positive impact manifests itself in a reduction of pain, fatigue, and anxiety but also in an increase of strength and flexibility (p. 2). Chan et al. (2014), agree that since the 80ties more and more studies about musician's wellbeing and performing medicine have appeared but "the lifetime prevalence of playing related injuries among musicians is still high" (p. 181). In a study that measured the effects of specific exercises tailored for musicians with PRMDs, Chan et al. (2014) found that physical activity and movement are important factors to help with PRMDs but also that sports do not necessarily help dealing with injuries. More specifically tailored physical activity programs for musicians with PRMDs could be a real way to improvement:

> A tailored exercise program for musicians was effective at managing PRMDs, especially in reducing the frequency and severity of PRMDs. Physical therapy exercises should be considered in modifying performance-related factors that have been reported to be predictors of PRMDs. […] The role of physical activity in the prevention and treatment of a number of physical and psychological chronic diseases is well established. Regular general physical

> activity has been shown to improve muscular endurance and strength, pain relief and stress reduction, but may be insufficient to prevent PRMDs. Purpose-designed exercise programs are one of the few reported interventions shown to help in managing occupational musculoskeletal disorders. (Chan, Driscoll & Ackermann, 2014; p. 181)

According to Chan et al. (2014), musicians would benefit from such exercise programs by getting increased muscular support, postural stability and by working on their movement efficiency (p. 181). The results of the studies are clear: health education and musician friendly mild physical exercise programs in the music curricula and professional environments would benefit musicians' careers and wellbeing.

A study by Struhár et al. (2015) concluded that exercises based on spiral stabilization can improve static and dynamic postural stability. Postural stability is the ability to maintain an upright position while moving or standing. This could prove useful in the search for strategies to prevent and rehabilitate PRMDs.

2.3 Accordionists and PRMDs

Generally, there is a lack of accessible literature on PRMDs among accordionists and much of the existing literature is outdated, except for a few studies. Aparicio et al. (2016) conducted a study in Spain, to assess if children and adolescents who learn to play the accordion are more likely to develop musculoskeletal disorders than children who do not play any instrument. The study concluded that indeed, children who play the accordion report more pain and are more likely to develop musculoskeletal disorders such as a head forward posture and lumbar lordosis, than children who do not play an instrument. Several factors such as the weight, size, performance and carrying of the instrument on the back contribute to pain and "significantly compresses lumbar disc height in children" (p. 187). This indicates that accordionists could be at risk of developing serious disorders with long lasting consequences from early age if no measures are taken into consideration to counter these effects.

On the other hand, it has been assumed that accordionists are an exception when it comes to the frequency of PRMDs (Manchester, 2014). The editor of the 29. edition (vol.2) of *Medical Problems of Performing Artists (MPPA)* implies that according to a survey study by Linda Griffith (2012), accordionists, bandoneonists and concertinists have comparably little reason to be concerned with

PRMDs. Apparently only 33% reported PRMDs at some point of their life. Manchester (2014) states that the reason for this relatively low prevalence of PRMDs could be explained by the fact that accordionists spend considerably less hours on their instrument than in the case of “classical” instrument players (p. 55). In fact, I conducted a survey in the accordion class of Sibelius Academy (6 out of 15 bachelor and master accordion students replied to the survey), which indicates that accordion students practice between 18 and 36 hours a week. The hours variate depending on workload and personal planning, with an average of 28 hours per week.

Through statements like these it becomes clear that accordion as a classical instrument is still largely unknown in classical music and medical circles, and outlines the importance to conduct further research on PRMDs among accordionists.

3. THEORETICAL FRAMEWORK

This chapter outlines the theories that this study is based on. All musicians know the importance of practice, but many put their instrumental practice first but neglect their body's health. The theories of exercise behaviour will give us insight on people's motivation to engage into physical activity and adopt healthy strategies in their lives.
The theory of spiral stabilization has been found large success in the field of rehabilitation therapy of spinal disorders, but it can also be applied preventively. Spiral stabilization sets a solid anatomical and medical basis for the design of exercise programs tailored for musicians.

3.1 Theories of exercise behaviour

The theoretical framework of this study relies on a variety of theories about exercise behaviour. According to Biddle and Nigg (2000), pleasure, health, challenge, and social interaction are typical motives for adults to engage into exercise, although these motives can change:

> Younger adults are more motivated by challenge and fitness, and older adults by health. Motives for weight control and appearance are often endorsed more by women than men. (Biddle and Nigg, 2000, p. 291)

The theoretical models and approaches on exercise behaviour help us to understand how and why people might be motivated or not to start exercising and maintaining exercising habits. This study relies on two models explained by Biddle and Nigg (2000), the Health Belief Model (HBM) and the Self Efficacy Theory (SET).
According to Biddle and Nigg (2000) HBM suggests that people's behaviour to exercise depends on a variety of factors but with the main goal of avoiding illness:

> Health belief model (HBM) proposes that people will not seek (preventive) health behaviours unless they possess minimal levels of health motivation and knowledge, view themselves as potentially vulnerable to the health problem, view the condition as threatening, are convinced of the efficacy of the "treatment" and see few difficulties in undertaking the action. [...] The majority of HBM research […] has an illness-avoidance orientation. (Biddle & Nigg, 2000, pp. 292-293)

But Biddle and Nigg (2000) explain that the application of the Health Belief Model to exercise is problematic without further precisions because exercising for the purpose of reducing the risks of contracting musculoskeletal disorders is not the only motivation for people to start exercising.

On the other hand, Biddle and Nigg (2000) argue that the Self-efficiency theory (SET) explains that behaviour is affected by a persons' beliefs on his/her capabilities and expectations:

> Self-efficacy theory explains behaviour through 1) one's self-efficacy, the belief that one has the capabilities to perform a behaviour that will result in an expected outcome, and 2) one's outcome expectations, the expected consequences of successful behaviour performance. […] The theory recognizes that self-efficacy beliefs and outcome expectancies need to be at the same level of specificity as the behaviour itself. The theory does have some generalizability which is higher with more related behaviours. (Biddle & Nigg, 2000, pp. 296-297)

In our context, this means that a musicians' behaviour and decision to get better relies on 1) the belief of having the capabilities to get better (e.g. through smart practice and/or spiral stabilization exercises) and 2) getting the expected results, which would be getting fitter, more flexible, understanding movement and muscle-chains, being body aware and ultimately understanding how to play the instrument with the correct movements. According to Biddle and Nigg (2000), the generalizability of the SET is higher when the behaviours are more related (e.g.: understanding and training the lengthening muscle chains will rather help a musician to improve body awareness and give tools to improve his/her technique, than improving his sight reading skills.)

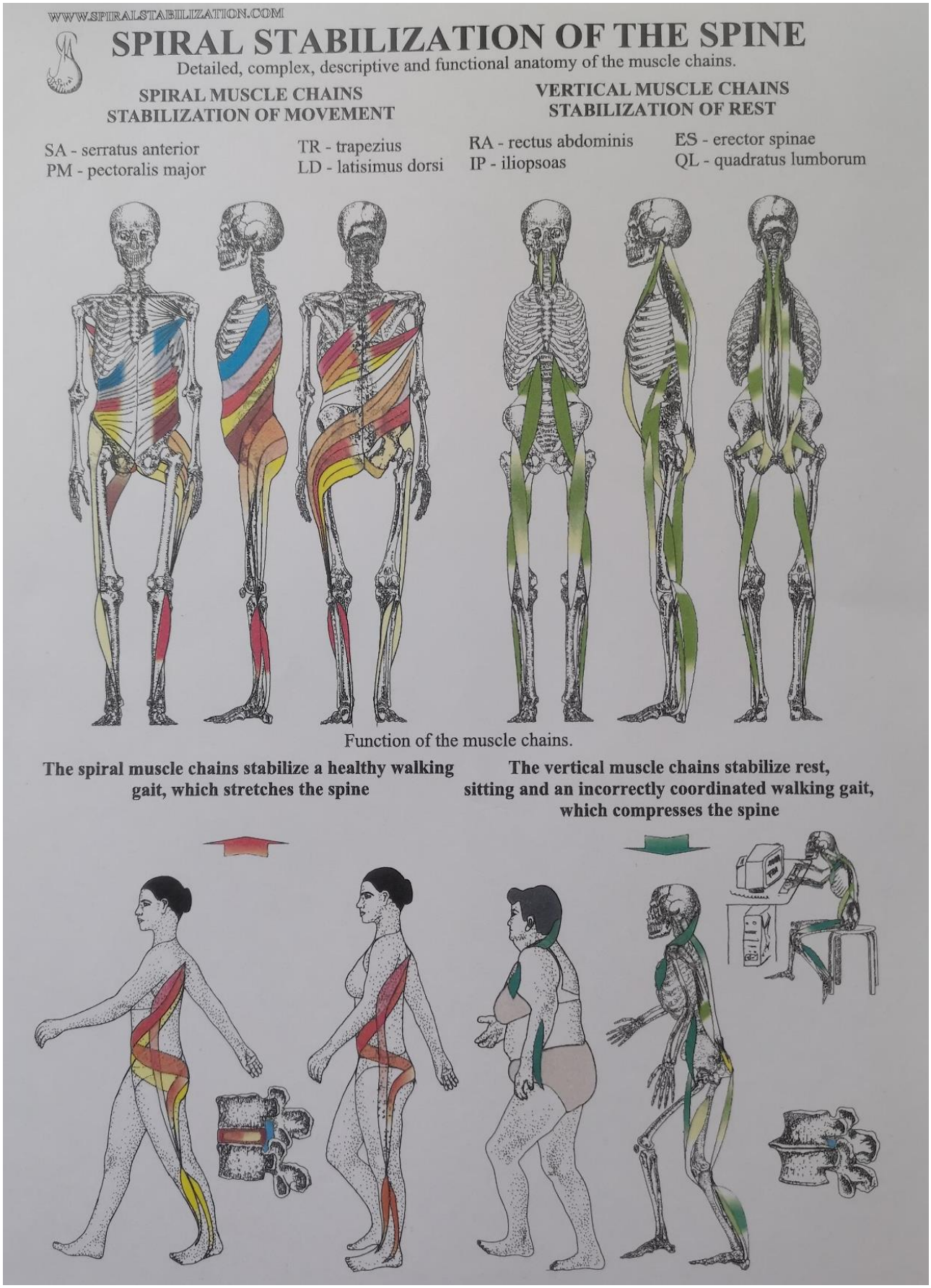
I believe that most PRMDs happen to musicians because they do not know their own body good enough. Many people neither have the necessary anatomic knowledge or body awareness to understand the kinetic functions of their bones and muscles. Many have accepted PRMDs to be a consistent part in the life of a musician. The lack of anatomic knowledge is an educational problem, the lack of body awareness a biological or a psychosocial problem. I believe that mostly PRMDs can be prevented when motivational, instructional, and pedagogical strategies align.

3.2 Spiral stabilization

According to Smisek (2013), Spiral stabilisation (SPS) is an anatomy-based exercise method, proven

to be successful in the process of rehabilitating musculoskeletal spine disorders (e.g.: scoliosis). Originally, the method was invented by Czech Doctor R. Smisek and developed to rehabilitated patients which had surgical intervention for spinal injuries. SPS is nowadays used to rehabilitate various spinal disorders without surgical intervention. The idea of SPS is to elongate the lumbar disks in the spine by activating elongating muscle chains. (See Figure 1: scheme of compressing and elongating muscles chains according to SPS method). The activation of these muscle chains is done through a series of exercises that use an elastic band to create traction and various other equipment and to train weak muscle links (Isomäki & Jaakkola, 2017). With SPS the weak links of the muscle chains in question are strengthened. Throughout these exercises, the lengthening muscle chains straighten and pull the spine upwards. Generally, the compressing muscle chains are overused, which can happen through unhealthy sitting habits, static posture, and slouching behaviour (see Figure 1). Green muscle chains (compress the spine) are overworked and tight. They need relaxation and stretching. Colourful muscle chains (lengthen the spine) are under working because of too much sitting and lack of movement as well as incorrect movement patterns. Colourful muscle chains need activation and strengthening.

Working the lengthening muscle chains has revealed itself to be an efficient way to lengthen the spine and cure back injuries and disorders, but also to improve body posture and healthy movement in general.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SA - serratus anterior
PM - pectoralis major
TR - trapezius
LD - latisimus dorsi
RA - rectus abdominis
IP - iliopsoas
ES - erector spinae
QL - quadratus lumborum
Function of the muscle chains.
The spiral muscle chains stabilize a healthy walking gait, which stretches the spine
The vertical muscle chains stabilize rest, sitting and an incorrectly coordinated walking gait, which compresses the spine

(Figure 1)

4. METHODS

This chapter outlines in detail the methodological processes of this research, such as the chosen methodology, the research aims and questions, data generation and data analysis methods. Further on, attention is given to the researchers' position in this study and ethical considerations.

4.1 Methodology

It seemed appropriate to conduct a series of qualitative interviews because my interest lies in specific peoples activities and their expertise in their respective field of work, which in this case would be accordion performance and pedagogy, and exercise programs designed for musicians based on spiral stabilisation. Braun and Clarke (2006a) simply describe qualitative research as a method which uses words as data that are collected and analysed in various ways.

This is an instrumental case study, because it focuses on the issue (the how and why questions) of prevention and rehabilitation of PRMDs. The data was generated through semi-structured qualitative interviews. This allowed to shape the interviews during the process according to the subject's detailed personal experiences. According to Wilson (2014), "the semi-structured interview method combines some structured questions with some unstructured exploration." Wilson (2014) values semi-structured interviews when the interviewer already has considerable knowledge about the topic and is interested in finding answers to complex issues, by asking spontaneous follow-up questions to clarify certain responses, explore meanings and go to the bottom of questions to expand the understanding of the problem at hand.

In a comparative study about approaches to case study methods, Yazan (2015) cites Stake (1995) to explain how researchers can use issues to structure their study and what differentiates an intrinsic case study from an instrumental case study:

> From a Stakian point of view, investigators "use issues as conceptual structure in order to force attention to complexity and contextuality [and] … because issues draw us toward observing, even teasing out, the problems of the case, the conflictual outpourings, the complex backgrounds of human concern […]. […] for intrinsic case study, case is dominant; the case is of highest importance. For instrumental case study, issue is dominant; we start and end with issues dominant. (Stake, 1995, p. 16-17, as cited in Yazan 2015, p. 140-141)

This research was designed as an instrumental case study because it investigates on the issue of PRMDs on a broader spectrum than only accordionists PRMDs, as it is seeking for answers from other fields than only accordion pedagogy and accordionists PRMDs.

Furthermore, to make this an ethnographic study about the prevention and rehabilitation of PRMDs in Finland would have been an option, but I decided otherwise. I do not believe that the topics I am interested in are especially representative for Finland and should be looked at from a more individual and topic-based perspective:

> Researchers often choose qualitative interviews over ethnographic methods when their topics of interest do not centre on particular settings, but their concern is with establishing common patterns or themes between particular types of respondents. (Holstein & Gubrium 2002, p. 85)

4.2 Research aim and questions:

This study aimed to investigate strategies that could help classical accordion players prevent and rehabilitate PRMDs, in order to improve their musicianship, becoming healthier and more body aware, and to be able to maintain high level performance standards throughout their musical career.
The research questions were:

- What are the key concepts to playing classical button accordion without pain and injury?
- How can someone learn to move correctly when playing an instrument?
- How can pedagogues improve their teaching to promote healthy musicianship?
- How can an exercise program based on spiral stabilization contribute to healthy musicianship?

4.3. Data generation methods

A personalised interview guide was drafted for each interview (See appendix B : B1, B2, B3 Interview guides), but the order of the questions could vary, and some answers were followed up on with questions that initially were not on the interview guide. All interviewees were chosen for their professional expertise and personal experiences in this field of study.

The data generation consisted in audiotaping three of the interviewees. One interview was submitted in writing.

The first interview was conducted face-to-face in the home of Dr. Mika Väyrynen and was about 90 minutes long. Mika Väyrynen is a renowned accordionist and accordion pedagogue at the Sibelius Academy of Helsinki. He was chosen because he is without doubt one of the most proficient and accomplished accordionists in the world and his knowledge about the handling and the anatomy of the instrument exceeds the existing literature on that subject. Väyrynen's expertise contributes to the data of this research by answering to the questions of how the accordion can be played in order to maintain high level musical aesthetics, prevent injury at the same time and by suggesting points of focus for pedagogues and players.

The second interview was with Hely Järvinen and was about 75 minutes long. The interview was conducted through online video conference, due to the Covid-19 crisis. Hely Järvinen is an instructor at the national Opera of Helsinki. She designed an exercise course for orchestra musicians, that is based on the Spiral Stabilization (SPS) method. In her course, she combines SPS with Pilates and Yoga exercises to help musicians to experience and practice healthy movements that can be applied to their instrumental practice. Hely Järvinen's data confirms research that has been highlighted in my literature review and suggests alternative ways to prevention and rehabilitation of PRMDs through the theory of spiral stabilization.

The remaining 2 interviewees are anonymous. Both are regularly attending participants of Hely Järvinen's course. They contribute to the data by giving a deeper understanding of the professional musician's experience with PRMDs and Hely Järvinen's course. The first anonymous interview was about 45 minutes long and was conducted through online video conference due to the Covid-19 crisis. The last anonymous interviewee preferred to answer to the interview guide in written, because of a lack of oral skills in English. Unfortunately, no follow up questions were asked in the fourth interview because of its written nature.

4.4 Data analysis methods

Coding and thematic analysis were used to analyse the generated data of this study. Braun and Clarke (2006b) explain that "thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within data. It minimally organizes and describes your data set in (rich) detail." (p. 79)

Once the data had been generated, the interviews were skimmed through by listening them entirely. After listening through the interviews several times, I coded what came up repeatedly and seemed

interesting (e.g.: sports, dance, posture, sitting, anatomy, surgery, prevention, stiffness) and then attributed those to themes (such as correct movement, incorrect movement, changing habits, benefits of SPS etc.). Then these themes were reorganized and summarized into larger themes which could then be used as subsections in my findings chapter (e.g.: "the importance of vocabulary", "Sports don't necessarily help", "What can we expect from teachers, therapists and doctors?" etc.).

4.5 Researcher position

I am an accordionist myself who has been confronted with PRMDs and has had an interest in the field ever since. My role was to ask pertinent questions and not to be biased by my own opinions and convictions. My personality played a role in relation to the participants because of my prior knowledge as a classical musician and my experience with PRMDs. I wanted to establish a conversation on our common knowledge and gather data from their experiences on the topic.

Me being a student and researcher did not put me in a position of power over my subjects. However, one of the interviewees once was a teacher of mine and two anonymous interviewees are professional orchestra musicians. Interviewing a teacher or performer can be delicate, especially about PRMDs. In many musician's opinion, playing-related injury is a sign of weakness and poor musicianship (Rickert et al. 2014a), which might cause a general reluctance to share personal experiences with injury. Therefore, participants could read and check the report of the transcript, and can ask to remove or change things (in the name of truth) they deem too personal or that could harm their career, social status, etc.

Onwuegbuzie et al. (2004) state that "according to Lincoln and Guba (1985) member check is the most critical technique for establishing credibility" (p. 314) in qualitative research. According to Onwuegbuzie et al. 2004, member check consists in the researcher systematically asking for feedback from the respondent about the generated data, its interpretations, and conclusions. (p. 221)

4.6 Ethics

To conduct the research ethically, trust and professionalism is required from the interviewer. Open ended questions were asked, which gave space for interpretation and were not leading to a suggested answer. All participants have signed a consent form stating the terms of the interviews and participation in the study (See Appendix C: C1, C2, C3 Consent forms).

The data was kept electronically and protected by code and only accessible by the researcher himself. The data has been erased after the evaluation of the research paper.

Parts of the transcript of the data that were generated from subjects who wanted to remain anonymous have been shown in print (not duplicated) under a pseudonym to the supervisor of the study and a fellow researcher. Data that might have revealed the identity of the subject was adapted (e.g. first trumpet of Helsinki symphony orchestra would be adapted to a first chair brass player from a major Finnish national orchestra).

5. FINDINGS

In the interviews with Mika Väyrynen and Hely Järvinen, the conversation seemed to evolve around one big overarching theme which is key to prevent and rehabilitate PRMDs: the acquirement of body awareness by understanding movement. Around this overarching theme, other themes emerged that will be explained in this chapter. What stands out clearly from both is that playing in pain is not a durable option.

> *"Why do we need to feel comfortable? If you have pain, how can you focus on anything else? You cannot feel freedom if you are in pain."* (Väyrynen)

5.1 Finding the correct movements

Väyrynen and Järvinen both talk about using correct movement and learning body awareness. They explain not only a variety of issues and stress factors that favour the development of PRMDs but furthermore, what are their strategies to teach, learn, understand, and experience correct movement.

Just like accordion, most instruments require to be held in a certain position in order to be played to their full potential. Classical accordion is held on the legs in a sitting position. Many accordion players have problems managing the weight and try to stabilize the instruments position by limiting its movement. The wish for control over the instruments leads to the development of strategies that are stressing the body permanently, which can lead to various problems. The root of many problems is the misunderstanding of gravity and the overuse of upper body strength.

> *"Weight doesn't exist, gravity does. We need to understand gravity to use it. Many players resist the gravity while playing, which creates stress in the body. We cannot make it weightless, but we can reduce the negative impact of weight and use it to our advantage. […] The only thing that is truly harmful is the transportation and carrying of the instrument. But that is not playing related."* (Väyrynen)

Similarly, Järvinen argues that:

> *"An overuse of certain muscles groups […] which compress the spine (called vertical muscle chains) has many negative effects on the rest of the body and the movement you do becomes*

> *heavier. [In that case] the body tries to maintain an unnatural position that costs a lot of energy. The playing of the instrument gets physically lighter when you use the correct muscles for the given movement and spiral muscle chains for support and stability. A common mistake I see is people who play their instrument only with the upper half of their body."* (Järvinen)

From an outside view it may seem that instruments are played with our hands only and that playing music is a static activity. But to play ergonomically, the entire body must be used, and understanding the compressing and lengthening muscle chains helps with that.

> *"Sitting or standing still is engaging the vertical chains of muscles, which according to spiral stabilization method compress the body and spine. If you want to work in that sitting or standing position for hours, you need to condition your body to engage the other chains of muscles that lengthen your spine, if not, it will start aching. You need the lengthening muscles to activate, but they activate in movement and not while being static. In other words, you must move while sitting and you must move when you do not play your instrument."* (Järvinen)

Mika Väyrynen expresses this idea in another way:

> *"It is important to coordinate the upper body with the legs in relation to the direction of the bellow."* (Väyrynen)

Learning postural stability and finding the neutral position from which every movement can start is one of the core elements that we can find in both interviews. The neutral position is a place where you are comfortable, but it is not a passive position, on the contrary: the core muscles keep you upright and ready to engage in the preparation of a movement that goes away from the neutral position. The alternance between tension and release of tension is key to ergonomic movement.

> *"[…] The shoulder girdle and the correct movement of shoulders and arms is one of the hardest things to learn, because it is very mobile and there are so many possible movements. Most people, musicians included, press the shoulders down. Down is a direction of movement, not a middle position, so we cannot start moving from there. We need to start from a neutral point, which for most people is higher up than what they think. Pressing the shoulders down is preventing the shoulder from moving correctly and creates tensions in the neck."* (Järvinen)

Similarly, Mika Väyrynen explains:

> *"The neutral spot is a physical form of being aware, a spot from where you can move anywhere and can always come back to. If you try to control and command the instrument, you lose against gravity. My approach is that the instrument is in the middle and the musicians' job is to play around it. The question we need to ask is: Mohamed to mountain, or mountain to Mohamed?"* (Väyrynen)

Elasticity in the body helps to go away from the neutral spot for a certain action and to come back after the action.

It appears that with age, people tend to move less and less because society requires it. This concerns all people, not just musicians. As children, movement happens naturally and instinctively but as we become adults, we lose this instinct. This has an impact on our ability to feel when a movement is done correctly or not.

> *"Babies are very relaxed. Children's explosiveness comes from their instinctive naturality. We tend to lose this naturality and relaxation with age and with psychological maturity. We lose it because we become aware of society as adults and in order to survive in society we battle with our bodies in very unnatural ways: we try to be taller than we are, try to look triangular, have strong shoulders, narrow hips, in order to comply to the general consensus of beauty, desirability and aesthetics. Society is quite harmful to our bodies. We need to develop our intellect, and through intellect and logic we can find again naturality in our movement."* (Väyrynen)

Similarly, Hely Järvinen states:

> *"Children move instinctively, they climb, run and crawl, they naturally use the muscles which are lengthening the spine. These exercises activate the spiral stabilizing muscles, so they do it automatically with the proper technique, until they start sitting more than moving. And that happens when they enter school. When they start working the muscle chains which compress the spine more than those that lengthen it, that is when the problems start. The solution would be to allow children to move inside and outside school. We must work against the digital world, because looking at a phone, sitting at a computer or tablet are all compressing activities,*

> *which are the worst for the human body because they are immobile. We need to walk, climb, squat, jump and then lie down and rest. […] Human evolution has not caught up with the way we are using our bodies nowadays and we end up working against our bodies."* (Järvinen)

Motivation, frustration, and practice seem to play a considerable role in the prevention and rehabilitation of PRMDs. Although Hely Järvinen's course is well liked by the participants and has shown to be successful with musicians, the attendance rate of the course at the opera house remains quite low. Course participant Anna explained that the main reason why people do not participate in the course is because they do not have enough time. But according to Hely Järvinen, time is not the only reason.

> *"I think most musicians don't understand the benefits [of the course]. They are not used to working with their body in this way and it requires patience. It is not a regular exercise class where you just come, get sweaty, leave, and feel good about yourself. It is a course which requires you to focus, concentrate and go through the inconvenience of relearning the ways of doing things with your body. Which is not necessarily fun. Sometimes it is easy but not always. […] There are no miracles. It can be hard to train the right muscle chains with spiral stabilisation. It takes a lot of work, motivation and endurance to get better."* (Järvinen)

According to Mika Väyrynen's pedagogic approach, there is no way to get better without going through moments of frustration. But this does not mean that during practice pain should be accepted, but that pain is the indicator for something that needs improvement.

> *"The red zone is where the progress happens. Confronting the frustration zone is the most important thing on the way to improvement. […] Never give up! When you feel you cannot reach the mastery of certain difficult pieces, think, that you need to get through the moments of confusion and frustration in order to find solutions to problems. If you give up, you might keep playing, but you are not solving problems. You must learn the way by yourself, the teacher is not responsible for that."* (Väyrynen)

Both Mika Väyrynen and Hely Järvinen are aiming to achieve positive long-lasting results with their strategies. Good health is not achieved by the occasional workout, just like when you practice your instrument. You need to repeat the correct movements many times and practice every day, which takes time, effort, repetition, motivation, and concentration.

> *"Looking after your body is not something you do for a short period of time, but something that needs to happen all the time, like regular practice. It is not a quick fix. The body needs to be conditioned all the time. You cannot condition your body and have it in storage for the future. It is about prioritizing things. Dancers do that because the body is their instrument. But musicians often forget completely about their body, even though they take tremendous care of their instrument. […] Once the people found the motivation to get better, they will work at it and focus and repeat. […] In order to really understand and relearn a pattern of movements you need about 50000 repetitions. Repeating is very important in the process of learning for muscle memory. It is a lot. But musicians understand this easily because they have done it before when they learned to play their instrument."* (Järvinen)

About the idea of sustainable practice, Mika Väyrynen states that:

> *"The search for ergonomics never ends because the point is that we can be able to be musicians as long as we want to be. When we are young, we have more physical capabilities. They start to disappear with age, so we need to learn to get more and more efficient, the older we get. Many musicians stop learning after graduation, and they get worse and worse until the end of their career. […] When you have reached the age of 50, that is when the test is done. If you can still play you must have done something right."* (Väyrynen)

Course participant Petteri also gave the same advice that durability should be a concern for music students.

> *"I think students should have a more realistic picture about professional life. To learn how to play is not enough. You must be able to play 50 or 60 years."* (Petteri)

5.2 PRMDs and the medical profession

Many musicians with PRMDs seek medical advice, but the doctors' understanding of playing an instrument is often limited. We can expect from doctors to treat the symptoms of an injury. But often, the root cause of the injury remains and can bring further complications after treatment.

> *"[Medical professionals] do not understand the instrument because they tend to see it like a static object."* (Väyrynen)

Mika Väyrynen agrees that doctors can treat the symptoms of injuries, but that they do not have knowledge or experience in instrumental practice.

> *"I am probably the person who has spent most hours training, observing, researching, and understanding accordion. What could a medical doctor possibly teach me about how to play the accordion? […] Playing accordion has its own very special form of existence and is a very multilevel discipline."* (Väyrynen)

In the prevention and rehabilitation of PRMDs, softer strategies that come from teaching and instruction may be more adequate before considering surgical intervention as a solution.

> *"[…] You cannot keep on going, pushing through the pain every day until suddenly you need an operation. You could have prevented that by moving your body correctly. Sometimes I feel that it is a big shame, but often people come to me only after several operations. They might have avoided the surgery and the trouble if they would have known how to move correctly. […] Spiral stabilization is cheaper and safer than surgery, preventive and rehabilitative."* (Järvinen)

Hely Järvinen also works in close cooperation with medical professionals when she sees the need for it.

> *"Some people are so stiff or there are many old injuries that the exercises based on SPS are not enough. Then they additionally need manual therapy which is also included in the original method of SPS: in some cases, I suggest massage, osteopathy, physiotherapy, acupuncture or a combination of a few of these."* (Järvinen)

Course participant Petteri felt that he benefited from the course at the Opera house the same way as from his osteopathic treatment in the past. He also states that he started taking the course on the recommendation of his physiotherapist.

5.3 Musicians and sports

Both respondents, Mika Väyrynen and Hely Järvinen, agree that sports are not a miracle cure for PRMDs, that sports done wrongly contribute to fast degeneration of the body and that the body knowledge from one discipline (sports) does not necessarily transfer to another (music).

> *"There is no direct link between playing an instrument and a certain sport. But sportive activity changes body awareness. Doing sports from young age intuitively helps us finding naturality of movement. We should transfer this intuition towards musical learning. But there is no direct influence from karate that makes you necessarily a better musician."* (Väyrynen)

Similarly, Hely explains that:

> *"Dancing or any sport does not necessarily give you the correct information. So, you can still be dancing from an outside point of view of how things look like and yet use the wrong muscles for the movement."* (Järvinen)

The common belief that being fit would make you a better musician is misleading and it has been proven by many excellent players, female and male, that muscle mass and strength are not a criteria for good technique, health or musicianship:

> *"Alone when we look at gender, men are not playing the accordion better than women because they are stronger as a fact. Somehow, without having the same mass of muscles, someone can use his technique very well. Technique comes from the brain, not from the muscles. The less we think of muscles, the less we think of finding excuses. After years of teaching experience, I saw that those who have the biggest muscles often have the biggest problems to play, because they want to use them too much."* (Väyrynen)

In spiral stabilization method, they talk about slow and fast degeneration of the body. Sports can easily degenerate the body if done wrongly:

> *"Doing sports with incorrect technique will give you injuries quicker than not doing anything. You can easily get injuries and get into bad shape because you do sports wrong. In that case it would be safer to go back to the sofa [and do nothing]."* (Järvinen)

Mika Väyrynen had his own share of accidents during karate training. There was a need for surgical intervention, which resulted with him taking a break from his martial arts and musical activities. Playing the accordion has always been a comparably soft activity for him. He insists that his knowledge in karate does not make him a better performer:

> *"The movements are fundamentally different: in martial arts, most of the power generating goes away from the body, not much towards the body as in accordion. I do not find much in common between these movements."* (Väyrynen)

But still, they do agree that physical activity is important for the development of motoric skills which are beneficial for the general health and crucial when playing an instrument.

> *"Through sports we learn to breathe. In musicking, we often resist breathing."* (Väyrynen)
> *"Obviously for the general health it is good to be fit."* (Järvinen)

5.4 The importance of vocabulary

One of the many advantages of a specifically tailored exercise program for musicians based on spiral stabilization is that its vocabulary is very clear, easily understandable and based on anatomy. SPS uses some equipment, especially a long elastic band to find the correct muscles activated for the specific movements. With correct instruction, you can experience the feeling of the anatomically correct movement. Many natural therapy methods that focus on the acquirement of body awareness (e.g. Alexander technique) share the same goals as SPS, but the language they employ is somewhat abstract and often based on imagery. Using imagery to activate certain physical responses from our body can sometimes be misleading. For example:

> *"With the word « relax » teachers or instructors often seek a certain quality, but muscles cannot fully relax, or the body falls on the floor. It cannot be fully in relaxation. What they should be saying is how to support your body in order that the superficial muscles can release their unnecessary tension, and you are still standing upright. It is very specific anatomical information that is needed to get good results. […] It comes from the knowledge of the teacher and how they instruct. Do they use the correct terms of anatomy and give the correct anatomical facts to make the movement happen or do they give visuals or imagery that everybody understands and executes differently?"* (Järvinen)

On the other hand, learning processes differ from person to person and finding the correct muscle chains can be difficult when one is overthinking the movement. Imagery can be used as a tool to avoid that if the anatomical reasoning behind the used image is firm.

> *"Some learn by watching, some by hearing and some by doing and in some cases different*

images can be a valuable tool to achieve required muscle activation bypassing the analytical mind in the process of learning movement. In this case the instructor himself must still have a clear understanding of which muscles are asked to activate by chosen imagery and then be able to see if it is happening or not. If it is not happening, images and visual cues need to be changed to precise anatomical cues in order to achieve the required effect. Purpose of the exercise is always the correct anatomical muscle connection, activation, and relaxation. There has to be real strength in certain muscle chains to hold the body in good alignment and that strength does not come by imagining it but by activating the correct muscle connections and repeating it until they are stronger." (Järvinen)

6. DISCUSSION

The following chapter will outline different interpretations of the findings, regarding the theoretical framework and the previously highlighted literature.

6.1 Attitudes in learning and teaching

Both Mika Väyrynen's approach to playing and teaching the accordion, and the exercise program that Hely Järvinen tailored for musicians are aiming at the same goals: not only do they engage the student or participants of the course to understand movement, but furthermore encourage them to believe in their capability to get better, to be independent, to take responsibility of their own health and to keep themselves in a good condition.

In Hely Järvinen's course, the exercises are designed in a way that the musicians can experience the good movement, explore the muscle chains, and understand the anatomy of the body. Through explorative understanding of the anatomy they can then recreate the movement on their own and practice it. The aim of these exercises is to practice the anatomically correct movements that feel comfortable, just like the practice of a musical instrument is aimed at finding the movement and technique that produces beautiful sound. Transferring this knowledge to the instrument can be partly supervised by the instructor, but of course the understanding of the specific instrument by the instructor is limited. Most importantly, during individual instrumental practice the musician must focus on relearning to play comfortably, which can be difficult at first because changing habits is always hard and frustrating. Sometimes good results come fast, but often the newly learned movements need practice.

Mika Väyrynen's approach to playing and teaching the accordion aims at developing problem solving qualities. The teacher has the experience of how it can be done, because he has done the research for himself and can therefore guide the student to find the ways of playing the accordion that suit him/her. On the other hand, generalizing is dangerous here because every students' needs, level of progress, personality and body is different.

There are no fundamental differences in both Hely Järvinen's and Mika Väyrynen's attitudes on how to prevent or rehabilitate PRMDs. Both respondents insist on the importance of connecting the upper body and lower body parts while playing and developing postural stability. The fundamental

difference lies within the vocabulary that they use.

Considering the health belief model (HBM), it becomes clear that there are more than a few difficulties to undertake healthy behaviour for musicians. HBM suggests that generally musicians do not try to prevent PRMDs actively unless they are motivated to be healthy, have minimal health knowledge, acknowledge that they are potentially vulnerable to PRMDs, view PRMDs as threatening to their career and livelihood, believe in the efficacy of a certain exercise program and see little obstacles to undertake change.
Through HBM we know that the musician's attitude to get better is a key factor in tackling PRMDs. As understood from Hely's statements, often musicians do not have the necessary health knowledge to understand the benefits of her course. There appear to be many hurdles for musicians to start and maintain healthy behaviours. The highlighted literature suggests that not only health literacy among musicians, but also the social culture in orchestras and other music institutions (including music universities), are factors that influence musician's motivation and decision making to engage into healthy behaviours.

Through the lens of the Self-efficacy theory (SET), we understand why musicians may engage into physical activity with good intentions, but unfortunately with the wrong expectations. SET explains, why working out is not enough to be a healthy musician. As Hely said, the occasional workout where someone gets sweaty, might be good for the self-belief to be capable of undertaking exercise but might not full-fill the expectations and on the contrary, can even do more harm than good. This might sound like a discouragement do engage into physical activity, but it is not. Physical activity is important on many levels, but to be beneficial for the body it needs to be done right.
Also from Mika's statement we know that music students are sometimes motivated to engage into physical activity but have unrealistic expectations. SET explains why bigger muscles do not solve technical problems in instrumental performance. The more realistic expectation would be that through sports we may learn to become aware of certain muscles and to use our body efficiently, which is a quality that musicians should search for in their instrumental practice too.

6.2 Opportunities for policy makers and musicians

Musicians need to realise that in order to have a successful and healthy career as a musician, practicing the instrument every day is not everything. Musicians need to acknowledge that PRMDs are an issue in the music community. Music institutions and policy makers should consider it their duty to help

prevent PRMDs, by enabling information rounds and appropriate exercise courses for musicians. But also, musicians must stop making excuses for the various barriers that prevent them from being physically active or taking an exercise course for musicians. Music students and musicians must take the opportunity to participate and assume their part of effort and start prioritizing time investment for activities that are also sustainable for the body. It has been shown by Vervainioti and Alexopoulos (2015) that sick leave due to occupational injuries are costing cultural institutions a lot of money and it goes without saying that this money could be placed differently, if PRMDs can be prevented more efficiently.

6.3 Anatomical framework and intelligible vocabulary

It has occurred that vocabulary plays an important role in the process of understanding how to achieve body awareness. The vocabulary used is very specific and clear in Hely Järvinen's method. This points to the direction, that the transmission of this practical anatomical knowledge is key to understanding it and that the vocabulary used for that transmission must be intelligible for the learner. A clear anatomic vocabulary and medically fact-checked framework is what makes this training course based on SPS especially designed for musicians a real alternative to methods such as Alexander technique, that are less precise in their language and rely on the use of imagery. The use of imagery in teaching and instruction is common and indeed, imagery can sometimes be useful to bypass the cognitive processes (e.g.: overthinking a movement) and activate the muscle chain that the instructor aimed at. But the use of imagery must be backed by factual anatomical thinking. It is a question of intelligible communication and truthful instruction.

The problem of vocabulary is directly linked to musicians' health literacy. It is arguable that having a better general anatomic knowledge could help musicians to understand PRMDs better and make instrumental or exercise courses more intelligible for musicians. Maybe this way, musicians can engage into meaningful exercise behaviour with appropriate expectations and outcomes. Further research could be conducted on how health literacy and precise anatomic vocabulary in instruction and teaching can influence the musicians practical understanding in their instrumental playing technique and their understanding of PRMDs. Especially designed training courses for musicians such as Hely Järvinen's course at the National Opera of Helsinki, do help to curb PRMDs in the professional musical environment and could eventually be used as a physical training/practical anatomy instruction course for music students in music universities.

6.4 A need for communication between medical and musical world

It is quite typical for musicians to disregard medical professionals' opinions when it comes to their instrumental playing habits, which is understandable, considering the amount of time they have spent to master their art. It is also understandable that trust between musicians and doctors is tainted, since so many people undergo irreversible surgery that heals the symptoms in a first place but does not treat the problem at its root causes. But more and more medical professionals are getting instructed on therapeutic strategies to curb PRMDs. Spreading the information about cross-sectional research made by medical doctors and high-level musicians is important to impact the quality and efficiency of medical treatments and to ensure trust and positive communication between musicians and medical professionals.

6.5 Increasing inactivity, a societal phenomenon

Both Mika Väyrynen and Hely Järvinen agree that the evolution of western societies have become more and more brain focused, that people neglect their bodies by engaging in too many static activities and that the urge to follow the contemporary ideals of human aesthetics can be harmful to our bodies. Discussing the instinctive naturality of movement in children was particularly interesting. Further studies on what causes the general decrease in adults physical activity with age could be a way to find out if people would still be in need of courses that teach body awareness, when all they needed to do is keeping physical movement a consistent part of their everyday life in order to maintain the instinct of natural movement. It is arguable that work-related occupational injury and PRMDs could be linked to a much bigger societal and institutional problem. The root of the problem could lie in the many hours of physical inactivity humans spend throughout their life, in education, at work and during their free time.

7. CONCLUSION

The overarching aim of this research was to investigate strategies that support the prevention and rehabilitation of performance related musculoskeletal disorders among high level accordion players. Through the research process I became familiar with the key concepts of prevention and rehabilitation of PRMDs in instrumental tuition for accordionists and physical exercise strategies based on SPS. At the end of that process I had clear ideas about what else can be researched that could further the understanding in this domain.

In the study design it was planned to make an exercise session with the accordion with Hely Järvinen to explore more specifically the muscle chains that are active during accordion performance. Unfortunately, due to the Covid-19 crisis, this was not possible, and the interviews had to be conducted online and the practical session with the instrument had to be cancelled.
There is limited literature on the nature of accordionists PRMDs, therefore it would have been interesting to interview accordion students from Sibelius academy about their experience with playing-related injury and pain. Due to a lack of time and resources this could not be done in this study. Maybe this could be the next step to identify the issues of accordion playing on a pedagogical and performing level.

The results and discussion indicate that several factors help the prevention and rehabilitation of PRMDs in instrumental teaching and in physical exercise instruction: to learn healthy movement, the use of precise vocabulary and intelligible communication from the instructor/teacher is crucial to understanding the physics of the instrument and the anatomy of the body. The decision to engage into healthy behaviour may depend individually on a musicians' health knowledge. It has become clear that there are no quick medical solutions to cure playing related pain and injury, but that hard and smart work are part of leading a sustainable and healthy life as a musician. Better education and communication between professionals in the fields of medicine, therapy and pedagogy could help the musician community in their ability to take choices regarding the strategies they chose to deal with PRMDs. A broader vision indicates that occupational injury and PRMDs could be caused by a larger societal issue that is linked to increasing physical inactivity of people during their education, work, and free time. There are a set of possibilities for policy makers that could benefit the musicians and the cultural institutions, such as organising information rounds about PRMDs and exercise programs for musicians to improve practical health knowledge and health literacy.

Personally, I would encourage accordion pedagogues to constantly research on finding better ergonomic ways of playing and to open their mind towards programs that focus on healthy movement. Pedagogues have an enormous influence on the development of their students and should take the opportunity to familiarize themselves with the basics of anatomy and musculoskeletal movement. The instrumental teacher and performer should have a researcher mentality, to discover always newer and better ways to play, not only by copying prior teaching methods. By understanding movement and being able to precisely name and differentiate the body parts, the teacher can articulate his ideas and help the student to better grasp the right intention when it comes to ergonomics.

In conclusion, PRMDs are a complex issue for musicians since there are so many factors involved that change individually from person to person. It is obvious that playing in pain is not a sustainable option and that there are ways to prevent and rehabilitate PRMDs. In European accordion pedagogies, the instrumental expertise has developed a lot on the level of musicality and interpretation but can still improve in its understanding of the technical aspects. In all instrument groups, musicians with PRMDs take irreversible decisions by undergoing surgery before exploring the softer and safer strategies. To prevent and rehabilitate PRMDs, it should become a priority to improve the health literacy of musicians and music students, and to inform about the strategies that can help improve correct movement and ergonomic instrumental practice. To do so, medical professionals and policy makers need reliable research that assesses the efficiency of exercise programs that are tailored for musicians. Hely Järvinen’s exercise course at the National Opera of Helsinki has shown positive results and is promising success in this field. Furthermore, it would be interesting to conduct research about the increasing physical inactivity of people in western societies and its impacts on human health and the instinctiveness of movement.

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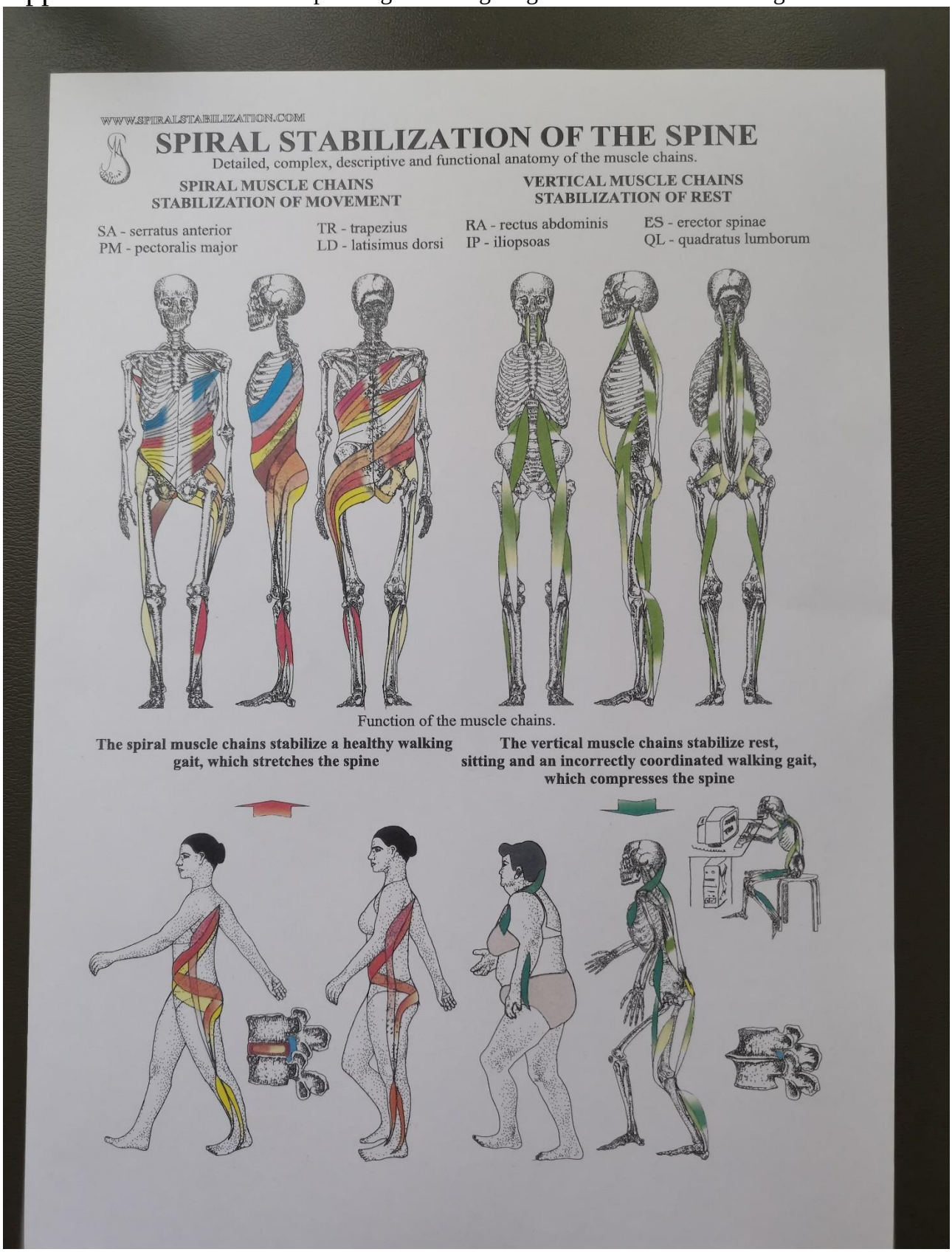
APPENDIXES

PRMDs = Performance-related musculoskeletal disorders
SPS = Spiral stabilization
HBM = Health belief model
SET = Self-efficiency theory

Appendix A: scheme of compressing and elongating muscles chains according to SPS method



(retrieved from www.spiralstabilization.com)

Appendix B: Interview guides

B1 MIKA VÄYRYNEN

Interview guide/Interview questions

Hello,

As you know, I am conducting a research about accordion players wellbeing and I have come to you knowing that you have had an extensive artistic career as an internationally renowned accordionist and accordion pedagogue. Can you briefly present yourself?

What are exactly the challenging factors that make playing the accordion a difficult instrument?
How problematic do you consider the carrying of the accordion from point A to point B? Is accordion an athletic activity? Why? Why not?
When you work with composers, how do you raise awareness of these factors?
Mens sana corpore sano: in relation to accordion, what do you think about this expression?
What do you understand under musical hygiene?
What strategies do you use to lead a healthy life as an accordion player?
What role do sports have in the wellbeing of a musician?
What are your thoughts on warmups and stretching?
What role does mental practice play in your routine?
Is it important to feel comfortable while playing your instrument? Why?
What can you tell about being aware of your own body?
What can you tell about core relaxation and “active laziness”?
What are your personal experiences with accordion related injuries?
What caused the injury?
How did you feel at that time?
Did you seek for help?
How did you deal with it, emotionally, practically and medically?
What kind of advice have you got from medical professionals, general doctors, osteopaths, physiotherapists? Were they useful or not?

Teaching:
Why do you implement healthy strategies in your teaching? Compared to the past, can accordion be learned and taught in a more sustainable way for the human body nowadays? What has changed? What has not ?
What do you think of strategies such as Alexander technique and Feldenkreis?
How do you teach children, teenagers and young adults to care and listen to their body?
Balance and movement efficiency, understanding gravity and human physiology: how do you teach this? How much time can you spare for this in a lesson?
Do your students sometimes complain about pain?
What is your reaction?
Would you consider that physical wellbeing has a direct effect on a pupil’s motivation to practice?
In our opinion, is there a common accordionist “illness” (such as chronic backpain, tennis arm, stiff neck)? What do you think are the 3 most common mistakes among professionals and advanced accordion learners which lead to injuries or pain?
What kind of medical help would you suggest to a student with severe accordion related pain?
- How do you know if it is accordion related?
- Would you know where to seek for help?

In your opinion, are there issues with the design of accordion at its current state of development?
- What can be done better?
- What about pedagogic instruments?
- What about straps? (traditional, PasiPro or Jaccomuccis ergonomic straps)

Is there anything that you would like to add to this interview that has not been asked beforehand but what you deem important in this subject?

B2 HELY JÄRVINEN

Interview guide/interview questions
Hello, Could you introduce yourself please?

Could you please tell me about your work at the Finish national Opera?
What is movement therapy? What is spiral stabilization?
What is your motivation in this field? Do you play any instrument?
Why did the opera hire you?
What kind of problems do you meet when working with musicians?
How open or reluctant are musicians towards movement therapy? How high is the response rate?
With what kind of problems/injuries do they come to you?
How long does it take to get results?
To whom do you recommend spiral stabilization?
Is it preventive or is it rehabilitation?
What are the benefits, compared to other wellbeing/bodyawareness strategies such as Alexander technique and Feldenkreis? What are the downsides?
Can spiral stabilization be harmful?
What about sports? Do musicians generally exercise enough, besides practicing their instrument?
What kind of sportive activity do you recommend to musicians?
Where are the limits of a musicians body?
How do you teach body awareness through movement therapy and spiral stabilization? How do you help musicians translate this to their instrumental practice?
How important do you think knowledge of anatomy is for musicians? In your opinion is all movement and exercise good for musicians?
How do you work with musicians which hat surgery or other medical intervention due to playing related injuries? What are the problems between the modern field of medicine and the work of musicians?
How do you see movement therapy and spiral stabilization in the future?

Let's talk about accordion :
As a test, I will put the accordion on your legs, to give you a rough understanding of the weight and shape of the instrument. Through your observation, which are the danger zones of accordion players that they should be mostly careful about?
Many accordionists struggle with the return of the bellow, and bellow changes in general. What advice could you give on that?
Do you have any thoughts on these 2 different models of straps? (traditional straps, ergonomic straps)
What do you think about the fact that children who learn accordion are more likely do develop lumbar scoliosis than children who do not?
In your opinion, how can accordion teachers improve their pedagogical methods in order to raise healthy musicians? How would you imagine working with music students or instrumental teachers, at a music academy or university?
Is there anything that you would like to add to this interview that has not been asked beforehand but what you deem important in this subject?

B3
ANONYMOUS INTERVIEWEE

Interview guide/interview questions for participants of H. Järvinen's course

Can you please tell me a bit about your background as a musician?
a. What instruments do you play?
b. Are you a musician by occupation or do you have a different occupation?
c. How long have you been playing it?
d. How often and for how long do you play/practice?

What kind of physical exercise do you do now? What have you done in the past?
Do you have any other hobbies besides music? What have you done in the past? Do they influence/impact your life?
Did you ever have any performance-related musculoskeletal disorders related to your instrumental practice? If yes, can you describe them? How did you manage them? Were you able to continue playing or did you need to take a break or stop? Were there any people available for you to consult in such matters?
Did you ever considered to stop completely playing your instrument because of a PRMD? Did you take a break from your work as a musician? If yes, how did you feel about that?
Did you ever consult medical professionals and physiotherapists to help you with the pain you experienced during music making? How often did you consult them when you experienced pain related to playing music? Other pain?
When and why did you decide to take lessons with Hely Järvinen's? Tell meaboutyour experience:
Can you explain in your own words what the course consists in?
How often do you have sessions?
How would you describe your body and movement awareness before and after taking the course?
Have you felt any kind of results? Can you describe them? When did you notice them? How did you notice them, what changed?
How have you translated the training with Hely to your instrument? Or to your other everyday life activities.
Did you discover any bad habits that you had to get rid of? How have you tried to overcome them? Has it been hard to change your habits?
How accessible is this course to you? What if it wasn't?
How do lessons with Hely compare to any other methods or approaches you have tried (e.g Feldenkreis, alexander technique). What is the same or different about Hely's approach? Which methods or approaches, or which parts of them, have been the most useful to you?
Based on your experiences managing and preventing playing related injuries, what recommendations do you have for:
music students
other music professionals
music universities
teachers

Appendix C: Consent forms

C1 MIKA VÄYRYNEN

Consent to Participate in a Research Study

Title of Study: AN INVESTIGATION ON STRATEGIES SUPPORTING THE PREVENTION AND REHABILITATION OF PERFORMANCE-RELATED MUSKULOSKELETAL DISORDERS AMONG HIGH-LEVEL ACCORDION PLAYERS

Investigators:

Name:	**Frin Wolter**	**Dept:**	PIMU	**Phone:**	00358413671798
Name:		**Dept:**		**Phone:**	00352621277896
Name:		**Dept:**		**Phone:**	

Introduction
You are being asked to be in a research study about healthy strategies to learning to play the accordion.
You were selected as a possible participant because your expertise in the field may be interesting to my study and can contribute to the general knowledge of the topic.
I ask that you read this form and ask any questions that you may have before agreeing to be in the study.

Purpose of Study
The purpose of the study is to help accordion teachers, performers and learners to develop and confirm healthy strategies of playing the accordion which are sustainable, support body awareness, physical wellbeing, efficiency and endurance.
Ultimately, this research will be published as my final master's thesis.

Description of the Study Procedures
If you agree to be in this study, you will be asked to do the following things:
60-90 minutes interview about the following things:
Answering to questions related to your expertise of learning and playing the accordion, the challenges you overcame as an accordionist.
Sharing your own experiences with injuries and the difficulties you encountered.
Your thoughts on the relevance of such a study.
Your opinions and thoughts on various themes related to accordion, such as the manufacture, shape and weight of the instrument, pedagogical experiences and findings.

Risks/Discomforts of Being in this Study
There are no reasonably foreseeable (or expected) risks. There may be unknown risks.

Benefits of Being in the Study
There are no benefits included in participating in this study.

Confidentiality
Your identity will be disclosed in the material that is published. However, you will be given the

opportunity to review and approve any material that is published about you [*Additional Waiver of Confidentiality must be included; see Forms/Informed Consent section of website]*.

Payments
You will not receive any payment/reimbursement for your participation in this study.

Right to Refuse or Withdraw
The decision to participate in this study is entirely up to you. You may refuse to take part in the study *at any time* without affecting your relationship with the investigators of this study or Sibelius Academy. Your decision will not result in any loss or benefits to which you are otherwise entitled. You have the right not to answer any single question, as well as to withdraw completely from the interview at any point during the process; additionally, you have the right to request that the interviewer not use any of your interview material.

Right to Ask Questions and Report Concerns
You have the right to ask questions about this research study and to have those questions answered by me before, during or after the research. If you have any further questions about the study, at any time feel free to contact me, *Frin Wolter* at *frin.wolter@gmail.com* or by telephone at *00358413671798*. If you like, a summary of the results of the study will be sent to you.
If you have any other concerns about your rights as a research participant that have not been answered by the investigators, you may contact Danielle Treacy, Seminar and Written Work instructor, Sibelius Academy, University of the Arts Helsinki at danielle.treacy@uniarts.fi.
If you have any problems or concerns that occur as a result of your participation, you can report them to Danielle Treacy at the e-mail address above.

Consent
Your signature below indicates that you have decided to volunteer as a research participant for this study, and that you have read and understood the information provided above. You will be given a signed and dated copy of this form to keep, along with any other printed materials deemed necessary by the study investigators.

Subject's Name (print): _____
Subject's Signature: _____ Date: _____

Investigator's Signature: _____ Date: _____

C2 HELY JÄRVINEN

Consent to Participate in a Research Study

Working Title of Study:	AN INVESTIGATION ON STRATEGIES SUPPORTING THE PREVENTION AND REHABILITATION OF PERFORMANCE-RELATED MUSKULOSKELETAL DISORDERS AMONG HIGH-LEVEL ACCORDION PLAYERS

Investigator:

Frin Wolter	PIMU, Siba-uniarts	0413671798

Introduction
You are being asked to be in a research study about prevention and rehabilitation of playing related musculoskeletal disorders (PRMDs) among musicians.
You were selected as a possible participant because your expertise in the field of spiral stabilization and movement therapy could be of great benefit for this research.
I ask that you read this form and ask any questions that you may have before agreeing to be in the study.

Purpose of Study
The purpose of the study is to help music teachers improve their knowledge on how to prevent students to contract PRMDs during their studies.
Ultimately, this research will be published as a master's thesis and possibly as a report for the Finnish journal of music education.

Description of the Study Procedures
If you agree to be in this study, you will be asked to do the following things: you will be asked a wide range of questions about your work at the opera, your experience as a health practitioner with musicians (whose identities will remain anonymous) and to engage in a discussion around the topic. The length of the interview would be approximately between 45-60 minutes.

Risks/Discomforts of Being in this Study
There are no reasonably foreseeable (or expected) risks. There may be unknown risks.

Benefits of Being in the Study
There are no personal benefits for the interview subjects. However, as a goal this study could be published in the Finnish journal of music education which may result in increased visibility for the kind of work you do.

Confidentiality
Your identity will be disclosed in the material that is published. However, you will be given the opportunity to review and approve any material that is published about you.

Payments
No payment is foreseen for the subjects of this study.

Right to Refuse or Withdraw
The decision to participate in this study is entirely up to you. You may refuse to take part in the study *at any time* without affecting your relationship with the investigator of this study or Sibelius Academy. Your decision will not result in any loss or benefits to which you are otherwise entitled. You have the right not to answer any single question, as well as to withdraw completely from the interview at any point during the process; additionally, you have the right to request that the interviewer not use any of your interview material.

Right to Ask Questions and Report Concerns
You have the right to ask questions about this research study and to have those questions answered by me before, during or after the research. If you have any further questions about the study, at any time feel free to contact me, Frin Wolter at frin.wolter@uniarts.fi or by telephone at *+358413671798.* If you like, a summary of the results of the study will be sent to you.
If you have any other concerns about your rights as a research participant that have not been answered by the investigators, you may contact Danielle Treacy, Seminar and Written Work instructor, Sibelius Academy, University of the Arts Helsinki at danielle.treacy@uniarts.fi.
If you have any problems or concerns that occur as a result of your participation, you can report them to Danielle Treacy at the e-mail address above.

Consent
Your signature below indicates that you have decided to volunteer as a research participant for this study, and that you have read and understood the information provided above. You will be given a signed and dated copy of this form to keep, along with any other printed materials deemed necessary by the study investigators.

Subject's Name (print): _____
Subject's Signature: _____ Date: _____

Investigator's Signature: _____ Date: _____

C3 : ANONYMOUS

Consent to Participate in a Research Study

Title of Study: AN INVESTIGATION ON STRATEGIES SUPPORTING THE PREVENTION AND REHABILITATION OF PERFORMANCE-RELATED MUSKULOSKELETAL DISORDERS AMONG HIGH-LEVEL ACCORDION PLAYERS

Investigators:

Name:	**Frin Wolter**	**Dept:**	PIMU, Sibelius Academy	**Phone:**	0413671798
Name:		**Dept:**		**Phone:**	
Name:		**Dept:**		**Phone:**	

Introduction
You are being asked to be in a research study about prevention and rehabilitation of performance-related musculoskeletal disorders among musicians.
You were selected as a possible participant because you have been actively taking part in Hely Järvinen's course about body conditioning at the opera house and your experience could provide valuable information to my research.
We ask that you read this form and ask any questions that you may have before agreeing to be in the study.

Purpose of Study
The purpose of the study is to understand and analyze existing ways of prevention and rehabilitation of musicians PRMDs and help music professionals, students and teachers to have a better understanding of what needs musicians have when it comes to injuries.
Ultimately, this research will be published as a master's thesis and possibly as a report for the Finnish journal of music education.

Description of the Study Procedures
If you agree to be in this study, you will be asked to do the following things: you will be asked a wide range of questions about your work as a musician, your motivation to take Hely Järvinen's course at the opera house and to engage in a discussion around the topic. All the information you give will be strictly confidential and your name will not be mentioned in the study. The length of the interview would be approximately between 45-60 minutes.

Risks/Discomforts of Being in this Study
There are no reasonably foreseeable (or expected) risks. There may be unknown risks.

Benefits of Being in the Study
There are no benefits to participate in this study.

Confidentiality
The records of this study will be kept strictly confidential. Research records will be kept in a locked

file, and all electronic information will be coded and secured using a password protected file. All audio records will be saved for the time of the study on the investigators personal hard drive and erased after the publication of the study. I will not include any information in any report we may publish that would make it possible to identify you.

Payments
You will not receive payment for participating in this study.

Right to Refuse or Withdraw
The decision to participate in this study is entirely up to you. You may refuse to take part in the study *at any time* without affecting your relationship with the investigators of this study or Sibelius Academy. Your decision will not result in any loss or benefits to which you are otherwise entitled. You have the right not to answer any single question, as well as to withdraw completely from the interview at any point during the process; additionally, you have the right to request that the interviewer not use any of your interview material.

Right to Ask Questions and Report Concerns
You have the right to ask questions about this research study and to have those questions answered by me before, during or after the research. If you have any further questions about the study, at any time feel free to contact me, Frin Wolter at frin.wolter@uniarts.fi or by telephone at 0413671798. If you like, a summary of the results of the study will be sent to you.
If you have any other concerns about your rights as a research participant that have not been answered by the investigators, you may contact Danielle Treacy, Seminar and Written Work instructor, Sibelius Academy, University of the Arts Helsinki at danielle.treacy@uniarts.fi.
If you have any problems or concerns that occur as a result of your participation, you can report them to Danielle Treacy at the e-mail address above.

Consent
Your signature below indicates that you have decided to volunteer as a research participant for this study, and that you have read and understood the information provided above. You will be given a signed and dated copy of this form to keep, along with any other printed materials deemed necessary by the study investigators.

Subject's Name (print): _____
Subject's Signature: _____ Date: _____

Investigator's Signature: _____ Date: _____