**Programm**

**“Rehabilitation & Music”**

 **14.00 Opening    Music         ‘Fling’**

**Introduction *prof. Michiel Reneman (chairman), Groningen (NL)***

**14.15 Ergonomic tools, physiological devices and specific instruments to support music performance *prof. Matthias Bertsch, Vienna (Austria)***

**14.40 Music                  ‘A tribute to Hans Boschma’**

**14.50 Differential learning in musician's rehabilitation.  *Jaume Rosset I Llobet, Terrassa (Spain)***

**15.15 Music                 ‘Friersk’**

**15.25 Health literacy in Musicians                     *Vera Baadjou, Maastricht (NL)***

**15.40              Pause**

**16.10 Occurrence of Musculoskeletal Health Complaints and associated Risk Factors in Music and Non-music Students – Interim Results from an ongoing Cohort Study.**

***prof. Nikolaus Ballenberger, Osnabrück (Germany)***

**16.35 The neurology of synchronisation in music, dance & rehabilitation.**

***Gert Jan de Haas, Delft (NL)***

**17.00 Dance                ‘Dûns sit yn ús’ (dance fairy tale without limitations)**

**17.10 The Rehab Expertise Centre for Music & Dance (REC-MD)**

***Kees Hein Woldendorp, Beetsterzwaag (NL)***

**17.25 Formal opening REC-MD**

**17.35 The physiology and psychology of strong emotions in music.**

***prof. Eckart Altenmüller, Hannover (Germany)***

**Abstracts**

**Ergonomic tools, physiological devices and specific instruments to support music performance**

Prof. Dr. Matthias Bertsch

Abstract

Musical instruments are constructed for their sound characteristics and acoustic qualities. Musicians have to find appropriate positions for their supporting and playing techniques. While this can be hard for beginners, it remains physiologically demanding for professionals performing for many hours a day. For people with specific handicaps, there are even more challenges to adapt to the physiological difficulties of playing an instrument.

The development of supportive solutions and instrument adjustments has always been a secondary goal in the evolution of the instrument design, long before the invention of chin rests and other well-known ergonomic solutions. While some improvements are standard today, others are relatively unknown to most musicians and manufactured only in small quantities. Furthermore, there always have been inventions to optimize ergonomic features individualized for a specific person.

As a researcher, working with all kind of instrumentalists, many little-known creative solutions are seen, and one can wonder what else has been developed to support music performers to prevent physiological problems or how to perform with specific handicaps.

Starting with systematic online search combined with extensive interdisciplinary exchanges and dialogues with instrument makers, physiotherapists, music medicine specialist, audiologist, instrument teachers, scientist and others, a database collection started 2008. Since then, presenting the catalogue at meetings of experts of different fields, additional solutions or things have been added. The Filemaker database, named ERGO-music Collection, is regularly exported in a PDF-File, available as open source online at [www.DrTrumpet.eu](http://www.DrTrumpet.eu) together with a feedback form to add missing or new things.

Until now, over 600 items are listed and pictured. The database is structured with several keywords. Beside the name of the instrument type itself, there are the following categories: physical therapy; ergonomic instrument; carrying aids; gripping aid; ear protection; footrest; support; seat; shoulder rests; chin rests; accessory; cases; cold protection; rehabilitation; lips and teeth; breathing; sleep and relaxation; lighting; nails; hearing devices; physical handicap adaptions; physiological prevention; research tool.

Feedback of instrumentalists, physiotherapists and researchers have shown, that the ERGO-music Collection is a used and useful resource. The final result will be the next version after the next version. So, if you know further solutions or gimmicks, tools or gadgets you are invited to share the information through the feedback form or send an email to: bertsch@mdw.ac.at. Scientific communities are a good network sharing information, since we all search for solutions.

CV:

Matthias Bertsch is professor at the University of Music and Performing Arts in Vienna. He is the actual President of the Austrian Society for Music and Medicine ([OeGfMM.at](http://OeGfMM.at)) and head of the "Motion-Emotion-Lab at the Department of Music Physiology. He studied musicology at the University of Vienna, graduated with a (PhD) in 1999, with his works on trumpet performance in the fields of "Musical Acoustics" and "Musical Physiology". With his habilitation thesis in 2003 he qualified as a professor with tenure track in musical acoustics at the University of Music and Performing Arts in Vienna. In 2008, Bertsch trained as a biofeedback coach and joined the musician’s health group at the Music University as scientist in the field of music physiology. In 2009 he was elected as president of the Austrian Society for Music and Medicine (music medicine, music physiology, psychology of music. His interdisciplinary music research is focused toward empirical and data-oriented methods in the area of psychology, acoustics, organology, psychoacoustics, physiology and cognitive science. As a trumpeter, he performed within philharmonic Orchestra, Big Bands and brass quintets.

Contact:

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Physiology and Psychology of Strong Emotions in Music!

Prof. Dr. Eckart Altenmüller

Abstract

Music creates powerful emotions and organizes social bonds. Our emotions in listening to music depend heavily on learning processes and can be deepened through knowledge. Strong emotions leading to a "goose-bumps" experience occur more often when musical structural parameters are detected. Particularly effective are surprising moments with violations of musical expectation, but also information on the background of a composition can enhance the effect.

In several studies, we have worked out the acoustic and psychological parameters that promote "goose bumps" when listening to music. Strong emotional responses accumulated in particular when the volume increased in the higher frequency range between 1000 and 3000 Hz and when a musical structural break - the beginning of something new - took place. Psychological listener parameters were generally low perception thresholds, high vulnerability, strong musical interests, and a rather sensitive personality structure. In addition, learning and musical biography played an important role in the individual goose bump response.

Physiological changes went hand in hand with the subjective goose bump sensation. There was often an increase in skin conductivity and heart rate. However, the correlation between sensation and physiological response was not very pronounced, so that in many cases goose bumps are the pure mental representation of music. In the lecture, the findings are presented and embedded in an evolutionary model of the adaptive value of the goose bump response in listening to music.

CV

Eckart Altenmüller is a full university professor and medical doctor, and has an active research and concert career. He graduated in Medicine and in Music at the University of Freiburg, where he obtained is concert diploma in the master classes of Aurèle Nicolèt and William Bennett. His clinical training was in the Department of Neurology in Freiburg and Tübingen as a neurologist and neurophysiologist. In 1994, he became Chair and Director of the Institute of Music Physiology and Musicians' Medicine at Hannover University of Music and Drama, a position he has held for the past 22 years. In this role, he has continued his research into sensory-motor learning and movement disorders in musicians, into emotional processes while listening to music and into neurologic music therapy. He has published more than 200 scientific articles and has edited five books.

Dr. Altenmüller is Member of the prestigious Göttingen Academy of Sciences since 2005 and Vice-President of the German Society for Music Physiology and Musician’s Medicine. In 2013, he received the science award of the country of Lower Saxony, since 2015 he is vice-president of the University of Music, Drama and Media, Hannover.

Differential learning in musician's rehabilitation

Dr. Jaume Rosset i Llobet

Abstract

From a dynamic system point of view, disease is the result of an imbalance between how able the person is to adapt to demands. If the musician’s system is very adaptable, the amount of internal or external changes - necessary to exceed the system’s capacity to adapt and produce the illness- should be high. But if his or her neural representations are very rigid without the ability to accommodate easily to new requirements, little changes can produce a performance break down and injuries. Differential learning is a possible new tool to promote system re-adaptation after illness. This way of learning can also act as a prevention strategy to make the system more adaptable.

In the presentation an overview will be given of the theoretical and practical principles of differential learning on the basis of examples of musicians with motor function problems such as musicians' dystonia. In addition, the relevance of the principles of differential learning for the motor function training of non-musicians will be explicitly addressed.

CV

Jaume Rosset-Llobet, traumatologist, graduated at the Autonomous University of Barcelona. He did his PhD in the field of medical problems in human towers, a typical Catalan sport/culture. He has expertise in the fields of Physical Education, Sport Medicine, Orthopedic Surgery and Traumatology. He also did a postgraduate in Science Communication. Jaume is founder and medical director of Institut de l'Art, Medicina & Fisiologia, Terrassa (Barcelona) with a special focus on the sensomotory treatment of dystonia in musicians and other focal dystonia’s. Moreover, he is founder and manager of the Unitat Medicoquirúrgica de l'Art and Traumatologia de l'Esport at the Hospital General in Manresa (Barcelona). He is the director of the Fundació Ciència i Art. He received the Professional Excellence Award from the Consell de Collegis de Metges de Catalunya (Catalan Medical Association). Author of several science publications on performing arts medicine.

Occurrence of Musculoskeletal Health Complaints and associated Risk Factors in Music Students and Non-music Students – Interim Results from an ongoing Cohort Study.

Nikolaus Ballenberger, Dirk Möller, Christine Guptill, Julius Bruder, Christoff Zalpour.

Abstract

Musculoskeletal complaints (MHC) in professional musicians are common with lifetime prevalences of 62 to 93 %. 79% of music students reported playing-related pain. An interaction of physical, psychological, and psychosocial factors seems to be responsible in the development of these playing related complaints. Suggested predictors for MHC are gender, age, professional status, instrument type, number of years playing, hypermobility, stress, and musculoskeletal dysfunction. Therefore, a multidisciplinairy approach is needed in the rehabilitation of musicians with MHC. Identification of etiological mechanisms (risk factors) for playing-related complaints and understanding of interactions is necessary to improve treatment results. But, up to now this is not sufficiently investigated due to inappropriate, mainly cross sectional, study designs. Because of a lack of prospective studies in the field of music medicine, no causal relations could be identified in the aetiology of (playing-related) musculoskeletal disorders in instrumental musicians. There also are no incidences prospectively recorded, but only prevalence rates.

For this reason a prospective Cohort Study at the University of Applied Sciences of Osnabrück was started. Aims of the study were: 1. Determining occurrences (incidence and prevalence) of MHC among music students (University of Osnabrück and other study sites e.g. Alberta Canada), 2 to assess the difference in physical and psychological health between music students and students of other disciplines at baseline and course over time, 3. The identification of risk factors for health complaints based on health related variables at baseline, and 4. To construct a prediction model for MHC in musicians.

The measurements consisted of a self-designed questionnaire addressing history of pain, localisation of pain, habits, practicing and sports, validated questionnaires measuring health related QuoL, Stress symptoms, and Performance anxiety and physical examination including core stability, hypermobility, cervical range of motion, mechanosensitivity.

219 students are included for the cross-sectional comparison and 109 students for the longitudinal analysis so far. The monthly and year prevalence of MHC was 27% and 56% respectively. Incidence and prevalence of MHC strongly depends on the definition (e.g. how playing/all day life is affected).

At baseline bodily pain, N° of stress symptoms, physical and mental health, physical activity, planks, general mechanosensitivity, cervical CROM were significantly different between music students and control students.

Risk factors for all students based on longitudinal data for the development of MHC were being a music student, bodily pain, history of complaints, N° of stress symptoms, physical and mental health, and smoking (years). Among music students only the predictors were similar besides the effect of stress, performance anxiety and mental health. However, a protective effect of playing life time was found.

Furthermore, a set of mainly pain and physical health related variables including smoking showed good ability in predicting MHC.

In further cohorts the results need to be replicated and the ability of the prediction models needs to be validated. Additionally, occurrences and risk factors of MHC will be analysed body region and instrument specific.

CV

Nikolaus Ballenberger (1975) is professor for physiotherapy and clinical reasoning at the Faculty of Business Management and Social Sciences, university of applied science Hochschule Osnabrück.

He is Scientific board member at CRAFTA (Cranio Facial Therapy Academy), the German journal of Physiotherapy, and the journal “Physioscience”. Since 2014 he is member in project „Binnenforschungsschwerpunkt: MusikPhysioAnalysis“. Since 2015 he is PI of the project „MusikPhysioKohort: Physisches und psychisches Gesundheitsprofil von Osnabrücker Musikstudenten“ and PI of the project „Das Lernende Gesundheitssystem in der Region Osnabrück-Emsland (ROSE)“.

The focus of his research is on the development and validation of assessments and measurement instruments in rehabilitation, epidemiological research in musician´s health, data analysis and study designs, epidemiological research in musculoskeletal health and motion analysis.

**Publications (Last three years)**

Ballenberger, Nikolaus; Möller, Dirk; Zalpour, Christoff (2018): Musculoskeletal Health Complaints and Corresponding Risk Factors Among Music Students. Study Process, Analysis Strategies, and Interim Results from a Prospective Cohort Study. In: *Medical problems of performing artists* 33 (3), S. 166–174. DOI: 10.21091/mppa.2018.3023.

Ballenberger, Nikolaus; Piekartz, Harry von; Danzeisen, Mira; Hall, Toby (2018): Patterns of cervical and masticatory impairment in subgroups of people with temporomandibular disorders-an explorative approach based on factor analysis. In: *Cranio : the journal of craniomandibular practice* 36 (2), S. 74–84. DOI: 10.1080/08869634.2017.1297904.

Möller, Dirk; Ballenberger, Nikolaus; Ackermann, Bronwen; Zalpour, Christoff (2018): Potential Relevance of Altered Muscle Activity and Fatigue in the Development of Performance-Related Musculoskeletal Injuries in High String Musicians. In: *Medical problems of performing artists* 33 (3), S. 147–155. DOI: 10.21091/mppa.2018.3021.

Möller, Dirk; Ballenberger, Nikolaus; Zalpour, Christoff (2018): The German version of the musculoskeletal pain intensity and interference questionnaire for musicians (MPIIQM-G). Translation and validation in professional orchestral musicians. In: *Musculoskeletal science & practice* 37, S. 1–7. DOI: 10.1016/j.msksp.2018.05.005.

Piekartz, H. von; Stotz, E.; Both, A.; Bahn, G.; Armijo-Olivo, S.; Ballenberger, N. (2017): Psychometric evaluation of a motor control test battery of the craniofacial region. In: *Journal of oral rehabilitation* 44 (12), S. 964–973. DOI: 10.1111/joor.12574.

Piekartz, Harry von; Pudelko, Ani; Danzeisen, Mira; Hall, Toby; Ballenberger, Nikolaus (2016): Do subjects with acute/subacute temporomandibular disorder have associated cervical impairments. A cross-sectional study. In: *Manual therapy* 26, S. 208–215. DOI: 10.1016/j.math.2016.09.001.

Harb, Hani; Raedler, Diana; Ballenberger, Nikolaus; Böck, Andreas; Kesper, Dörthe A.; Renz, Harald; Schaub, Bianca (2015): Childhood allergic asthma is associated with increased IL-13 and FOXP3 histone acetylation. In: *The Journal of allergy and clinical immunology* 136 (1), S. 200–202. DOI: 10.1016/j.jaci.2015.01.027.

Raedler, Diana; Ballenberger, Nikolaus; Klucker, Elisabeth; Bock, Andreas; Otto, Ragna; Prazeres da Costa, Olivia et al. (2015): Identification of novel immune phenotypes for allergic and nonallergic childhood asthma. In: *The Journal of allergy and clinical immunology* 135 (1), S. 81–91. DOI: 10.1016/j.jaci.2014.07.046.

Health literacy: a new concept in the rehabilitation of musicians and non-musicians.

 Vera Baadjou

Abstract

Health literacy is defined by the World Health Organization as “the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health.” It is a wide range of skills from applying reading, writing and numeracy skills to health related materials such as medicine labels, to social and communication skills required for shared decision making and self-management. Lower levels of health literacy have been found among chronic patients; e.g. those with multimorbidity and/ or functional limitations, limiting their ability to make sound decisions in everyday life and control their illness. Poor health literacy has been associated with poor healthcare access, worse general health, more hospitalizations and higher mortality.

Three decades of research on the prevalence of musicians’ injuries and their reported causes underscore the importance of developing and implementing strategies for promoting health in student and professional musicians. Efforts to provide health information are often obstructed, however, by ingrained attitudes, behaviors and organizational cultures. Investigating health literacy can provide insight into health knowledge and competencies underlying musicians’ attitudes towards health that, in turn, can inform health education strategies and produce improved health outcomes for this population. A tool is being developed, based on the European Health Literacy Survey (HLS-EU47), asking musician respondents how easy it is for them to find, understand, judge and apply information about music-related health care, health promotion and injury prevention. Further deployment of this tool in international professional and educational settings is planned aiming to unravel the relationship between health literacy and health status of musicians.

CV

Vera Baadjou is a rehabilitation physician working for Adelante, located at the academic hospital in Maastricht, the Netherlands. She has a special interest in chronic pain rehabilitation and performing artists’ health care. She recently finished her PhD “Prevention of musculoskeletal complaints in musicians: Epidemiology, Phenomenology, and Prevention.” Vera is a member of the international Musicians’ Health Literacy Consortium.

**The neurology of synchronisation in music, dance & rehabilitation.**

Gert Jan de Haas

Abstract

Neurological synchronization is a brainstem function that facilitates integrated movement as well as goal-directed interaction with the environment. The neurons of the brainstem involved function as an internal pattern generator, but react to external rhythmic stimuli as well, making synchronization to music and dance in terms of associations, motivations and motor function possible, or better put, unavoidable. During this lecture the synchronization pathway from neuron to artistic performance and music/dance therapy will be explained.

CV

Gert-Jan de Haas is a neuropsychologist, but also graduated as a classical guitarist at the Amsterdam Conservatory. He is a consultant for complex neurological cases throughout the Netherlands. Apart from that he gives lectures in The Netherlands and abroad and is a guest lecturer at the Erasmus Medical University Faculty. As he is also a musician his recordings can be heard at Spotify, Itunes and the likes.

**The Rehabilitation Expertise Center for Music & Dance (REC-MD) at Revalidatie Friesland.**

Kees Hein Woldendorp

Abstract of presentation

This presentation consists of three short parts.

**Part 1:** Kees Hein will first provide an epidemiological overview of the current situation with regard to music medicine and the position of the Netherlands in this discipline. He will show that the Netherlands is rapidly catching up with other countries in the international field of music & dance medicine. This is evident from the recent series of PhD studies completed by, among others, Marjon van Eijsden, Boni Rietveld, Vera Baadjou and Laura Kok. The establishment of the Dutch Society for Dance and Music Medicine (NVDMG) has certainly contributed to this development. Unfortunately, there is as yet no solid scientific basis for adapted music making, though the initiatives in Great Britain (OHMI) are promising in this respect. In the Netherlands, Maarten Visser, Adams Music Center and rehabilitation center ‘Revalidatie Friesland’ are making good progress in this field.

Apart from adapted music making, we use music and dance in our treatment programs at rehabilitation center “Revalidatie Friesland”. However, the field of research into the use of music and dance in other areas of medicine is much less clearly defined, with activities being undertaken both inside and outside health care. Here too, the Netherlands seems to be establishing a position internationally.

Dutch rehabilitation medicine is considered to a high standard in the international research and clinical practice (see e.g. the Sidney Light Lecture in 2013 by Prof. Henk Stam for an
overview of the scientific impact of Dutch rehabilitation publications[[1]](#footnote-1)). However, the use of music & dance in Dutch rehabilitation medicine is a relative unknown topic; there is currently no overview of what is being done in this area and by whom. It is disappointing to note that, until now, there is no single guideline for rehabilitation medicine in which even the smallest role has been accorded to music and/or dance. We assume that this is just a matter of time, supported by the efforts of rehabilitation center “Revalidatie Friesland”.

**Part 2:** In the second part of the presentation, some examples will be given using music and dance in rehabilitation medicine.

**Part 3:** The third part includes the 40-year history of rehabilitation center “Revalidatie Friesland” with regard to the aspect of music & dance. A brief survey will be presented for the motivation establishing a Rehabilitation Expertise Center for Music & Dance.

Below, background information is provided about the Rehabilitation Expertise Center for Music & Dance (REC-MD).

Background information

**Introduction**

About 20% of the Dutch population are actively engaged in music or dance (thesis Boni Rietveld, 2017) Many of them, however, are hampered by physical and/or psychological problems impeding these activities, sometimes even to the extent that they threaten the careers of professional musicians and dancers. These complex problems require specific knowledge and skills of physicians and therapists achieving a good outcome of treatment. Centers with this expertise are scares, caused by a range of factors. First and foremost, music and dance medicine is a relatively imperfectly organized field of medicine, in which almost all medical disciplines participate to a greater or lesser extent. In addition, there is a great deal of ignorance, both among the musicians and dancers themselves, and among the physicians and therapists who are confronted with this problem in their practice. This lack of knowledge regards both the content (e.g., the relation between complaints and dancing/ music making is not recognized) and procedures (finding adequate treatment). The result is that people fail to seek for help or that they seek for it in a very (or too) late state of their complaints. Another possibility is that even harmful treatments are sometimes provided. This is an undesirable situation, which urgently needs to be addressed.

Rehabilitation center ‘Revalidatie Friesland’ (RF) is an organisation where these kinds of problems can be treated. However, many musicians and dancers with complaints are not aware of the services offered by RF. This despite the center’s many years of expertise in the treatment of musicians (and dancers), the educational activities, publications, the symposia organised by RF and other PR activities in both the media and scientific journals. This is another undesirable situation, which urgently needs to be improved.

The reason to set up the Rehabilitation Expertise Centre for Music & Dance (REC-MD) is RF’s attempt improving this situation. In addition, such an expertise center creates opportunities to do more scientific research to further optimize the treatment results.

**History of RF and music & dance**
Rehabilitation center ‘Revalidatie Friesland’ has acquired extensive expertise over the past 40 years with regard to rehabilitation medicine and music. For example, the center developed a combined therapy called Speech-Music Therapy for Aphasia (SMTA) for people with Apraxia of Speech and Aphasia due to brain injury, which has since been introduced across the Netherlands (and neighbouring countries). Its efficacy was proved in a PhD study by the clinical linguist Joost Hurkmans in 2016.

In addition, Rehabilitation Friesland has become an important treatment center for musicians with injuries. Madeleen de Bruijn, music therapist, started in 1976 with music activities for rehabilitation patients treated at RF. This resulted in the book “Muziek in de kinderrevalidatie” (1984) and a second book ten years later (“Muziektherapie op Maat”) with a wider focus on both children and adult. One of her focus of interests was to create adaptations of instruments together with specialized instrument constructors like Maarten Visser of the Flutelab. Under the names 'Music Injuries Clinic' and later 'Clinic for Musicians and Rehabilitation', Madeleen de Bruijn, rehabilitation physician Kees Hein Woldendorp and a team of rehabilitation therapists (physiotherapists, occupational therapists, social worker, psychologist) formally started (in 1998) to lay the foundations for the further development of knowledge about the diagnostics and treatment of injured musicians and adapted music making. Their efforts have resulted in many publications, media reports, three educational videos, and lectures at national and international conferences.

Moreover, Madeleen de Bruijn edited the handbook entitled *Music Therapy in Rehabilitation,* with various chapters written by employees of Rehabilitation Friesland. Woldendorp is one of the founding members of the Dutch Society for Dance & Music Medicine. He is also co-author of the digital database on embouchure, a website that has helped quite a few injured brass players find their way to the REC-MD. In 2013, an international conference about embouchure, singing and breath support was organized at Beetsterzwaag Woldendorp will defend his PhD thesis on this topic on 24 April 2019.

Together with the music therapists, RF’s aphasia team has developed specific and unique knowledge in the field of central auditory processing problems after non-congenital brain injury (including amusia). The center frequently consults both children and adults with these problems, who can benefit from the accumulated knowledge, which is hardly available anywhere else. The team has developed a draft international guideline for this subject. Various lectures have been given at national and international conferences, and a scientific paper has been published.

Work on the relation between rehabilitation medicine and dance is less fully developed so far, but also offers great potential. Regarding dance medicine, dancers with injuries to the musculoskeletal system are occasionally seen at the various locations of Rehabilitation Friesland, particularly at the outpatient rehabilitation clinic for musicians, in view of its close connections with the professional field of the various performing arts. In 2009, Rehabilitation Friesland organized the annual conference of the Dutch Society for Dance and Music Medicine in Beetsterzwaag.

In respect of using dance in rehabilitation, rehabilitation physician Wya Feenstra has studied the possibilities for using 'dance' as a therapy tool in the rehabilitation of patients. For example, Feenstra showed that patients with Parkinson's disease may greatly benefit from this form of therapy. The project “Dance on Prescription” gained great progress in 2018. Feenstra also aims treating (professional) dancers with injuries on a more permanent basis. This will enrich knowledge about dance in rehabilitation medicine. Subsequently, Feenstra intends starting a PhD project on this topic.

Rehabilitation medicine, music and dance have a lot in common. Clinical based practice has shown that knowledge and expertise developed in – and for – one of these two areas offer opportunities for cross-fertilization with related areas. A good example of experiences that have subsequently been applied in the rehabilitation of non-musicians is the cross-fertilization between the treatment of embouchure problems (muscle activity in the mouth area that is needed to play a wind instrument), dysarthria in stroke patients and eating problems in children due to cerebral palsy or other developmental problems. Another example is the recent pioneering use of e-rehabilitation for musicians who live far away from the rehabilitation center; followed by e-rehabilitation for other patients like stroke-patients.

**Some Facts**

1.    The Netherlands has 25,000 professional musicians and 7000 professional dancers. In addition, there is a huge group of 1,600,000 - 1,950,000 amateur musicians - including some 500,000 pop musicians and 600,000 people singing in a choir - as well as 1,300,000 amateur dancers (including ballroom dancing), partly thanks to among others the Princess Christina competition, the highly popular concerts by André Rieu and television programmes such as 'So you think you can dance'. In all, one fifth of the Dutch population are actively engaged in the performing arts (NVDMG brochure, 2018).
Injuries are common for dancers, musicians and singers due to their delivery of top performances. This occurs not only to the professionals, but also to the active amateurs, who together make up about 20% of the patients registered with the average general practitioner and rehabilitation medicine (NVDMG brochure, 2018)

2.    In Western society there are about as many athletes as dancers and musicians (Sataloff et al. 2010; Spahn et al.2011) It is shocking to notice the poorly care for musicians and dancers compared to athletes.

3.    It is not yet known how many children and adults with a functional disability have a request for help – and in which way-, to learn to play a musical instrument or dance in an adapted way. It can be assumed that the percentage of the disabled population desiring to play music or dance is equal to that of the general population.

4.    It is not known how many professional musicians and dancers have functional limitations with regard to music making or dancing as a result of an accident or chronic illness such as polyneuropathy. It is plausible that this concerns considerable numbers, because these professions are in the top 3 of most stressful professions (http://www.cremona musica. com/en/2017/03/21/playing-is-stressful-jobs/), and performing artists are accident-prone for a variety of biological, psychological, social and spiritual reasons (‘Gevaarlijk Spel’ Marc Stotijn, 2006) There are hardly any treatment centers (either in the Netherlands or abroad) that specifically focus on adapted music making and dancing. These musicians and dancers often have no idea that there are many opportunities for them to return to music making or dancing with assistance of an expert.

5.   Treating musicians and dancers is time-consuming, as it often concerns not only the aspects of conventional rehabilitation treatment, but also the specific music- and dance-related motor function aspects. Therefore, specific needs are necessary for the performing arts healthcare provider in terms of knowledge about performance related body functions and body structures, extra time investment per consult, extra space in the treatment room, and presence of a piano and/or a bar with mirror for dancers. These requirements are not widely available in routine health care.

The above facts show that there are many people who could potentially benefit from diagnostics and/or treatment at expert centers, such as rehabilitation center “Revalidatie Friesland”. In combination with the often intensive treatments, rehabilitation center “Revalidatie Friesland” aims to establish cooperation with the professional field around the REC-MD. Therefore, it focuses on training professionals in this field.

**The aim of REC-MD**

REC-MD aims to assemble activities and knowledge related to music, dance and rehabilitation, in order to encourage a further evolution, and to realize a significant potential for treatment, research and knowledge at rehabilitation center “Revalidatie Friesland”**.**

**Project results**

REC-MD will officially open at 24 April 2019, and it will combine treatment, innovation and scientific research. The center will function at regional, national and international levels regarding:

           1. The treatment of patients with music- or dance-related injuries at various levels of complexity,
2. Knowledge translation to individuals and groups of musicians, dancers, educational institutes in the field of music, dance & health care, as well as practitioners and (potential) referrers of musicians and dancers with complaints,
3. Knowledge development by scientific research.

The two main components of patient care will be:

1. The treatment of patients with music- or dance-related injuries, and

2. The development and implementation of rehabilitation treatments using music and dance (e.g. SMTA and Dancing with Parkinson).

**The REC-MD**
The expertise center is aimed at patients and practitioners. It has close ties with training institutes and hospitals (medical specialists). Conservatories, music schools and dance institutes are some of its natural collaborative partners, since they have many questions and much specific expertise in the field of music and dance. This can lead to valuable cross-fertilization in terms of knowledge development, and support the further development of scientific research under which providing student populations for research projects.

Staff at the expertise center will include rehabilitation specialists, therapists and researchers. The center will offer both clinical and outpatient treatments and will provide consultative services for communities in the field.

The expertise centre will be coordinated by Drs Joost Hurkmans and Kees Hein Woldendorp, and rehabilitation physician Wya Feenstra.

Apparently, the work at REC-MD regards many aspects of rehabilitation medicine, various patient groups, different organizations (such as health services and education) and medical and non-medical disciplines. This offers opportunities and requires a project-based approach. Research topics need to fit with the scientific research lines of the Academy of Rehabilitation Center “Revalidatie Friesland”. Treatment of patients with music or dance injuries will be performed by the current treatment teams at all outpatient clinics of rehabilitation center “Revalidatie Friesland”, supported if useful by the knowledge and expertise provided by REC-MD. The REC-MD at the location Beetsterzwaag focuses on professional musicians and dancers, or musicians with problems in the field of music medicine that fall outside the immediate field of knowledge of rehabilitation medicine (such as, embouchure).

In the Netherlands, there are hardly any rehabilitation centers that have made music and dance a focal point of their work. At present, patients are being referred to Beetsterzwaag from all over the Netherlands (and beyond), so there is certainly a potential market for music- and dance-related treatment.

1. E.g.: The Journal of Rehabilitation Medicine is the official journal of International Society ofPhysical and Rehabilitation Medicine **(**ISPRM**).** In 2012 25% of the papers was written in Sweden or the Netherlands. [↑](#footnote-ref-1)