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No.	Presenting Author		Poster	Workshop room	Plenary room
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28	Leoni Winter (Germany)	Selected physical characteristics and playing-related musculoskeletal problems (PRMP) in German adolescent string instrumentalists		x	
29	Lies Rombaut/ Inge De Wandele (Belgium)	Mechanisms of Functional instability as seen in symptomatic Generalized Joint Hypermobility		x	
30	Liliana Araujo (Great Britain)	Psychological skills and health-promoting behaviours in musicians		x	
31	Lisa Aufegger (Great Britain)	Rock around the clock? - An investigation of health promoting behaviour, pre-performance habits and personality traits in rock musicians		x	x
32	Lisa Aufegger (Great Britain)	Simulated musical performance spaces: The impact of virtual feedback on musicians' heart rate variability, breathing, state anxiety and self-efficacy		x	x
33	Mads Bruun Panduro (Denmark)	Classification of musicians shoulder dysfunction in clinical practice			x
34	Małgorzata Sierszeńska-Leraczyk / Wiktoria Pawelec (Poland)	Stage fright and physical condition of Wieniawski International Violin Competition participants		x	x
35	Mara Bianca Neneci (Denmark)	The EIR-project – The development of a device for measuring muscle strength		x	x
36	Maria Sandgren (Sweden)	The perception of the voice, health issues and work conditions among professional classical singers		x	
37	Marjatta Teirilä (Finland)	Awareness of professionally ultimate skills in musicians		x	x
38	Mark Scheper (The Netherlands)	Generalized joint Hypermobility in dance: a sign of talent or vulnerability		x	
39	Mary Mc Govern (Denmark)	Alexander Technique for Musicians - Workshop			x
40	Miikka Peltomaa (Finland)	Twenty years of Musicians' Medicine in Finland		x	
41	Nanna Mark (Denmark)	Patient cases from Clinic for Performing Arts Medicine: Musicians with severe symptoms of psychological distress			x
42	Niels Wedderkopp (Denmark)	Dance as a leisure time sport in childhood, effect on physical activity, motor performance and injuries in a large prospective childhood cohort		x	
43	Ola Ellefsen (Norway)	Mindfulness-based stress reduction program (MBSR) for musicians		x	
44	Peter Vuust (Denmark)	It don't mean a thing' – or does it? What musical training does to the brain.		x	
45	Sara Johansson (Sweden)	Musculoskeletal pain, work posture and physical activity among professional symphony and opera musicians in Sweden		x	
46	Tina Margareta Nilssen (Norway)	What is the optimal coordination of the musician's body for expressing music freely?			x
47	Titi Rahmawati (Malaysia)	Playing-related musculoskeletal disorders among classical piano students of tertiary institutions in Malaysia		x	
48	Ulla Munch (Denmark)	Psychology & Performance - Workshop		x	
49	Ulrik Röjjezon/Dag Ardel (Sweden)	Generalised Joint Hypermobility and musculoskeletal pain among professional classical orchestra musicians in Sweden – a pilot study		x	
50	Ulrik Röjjezon (Sweden)	Prevalence of Musculoskeletal Pain and Generalised Joint Hypermobility among Jazz Musicians in Swedish Big Bands		x	

Title	A web-based health promotion intervention for music students in Sweden
Author(s)	<i>Agneta Larsson, PhD¹; Ulrik Röijezon, PhD¹; Ing-Mari Olsson, PT³; Karin Engquist, MD³, Gunvor Gard, PhD^{1,2}</i>
	<i>1: Luleå university of technology, Luleå, Sweden</i> <i>2: Lund University, Lund, Sweden</i> <i>3: Occupational Health Unit for Artists and Musicians, Malmö, Sweden.</i>
	<p>Aim: In this presentation a study protocol for a web-based health promotion intervention for music students, and the rationale behind it, will be described. The aim is to develop a new dynamic web-portal with an interactive multimodal health intervention program for musicians and music students, and perform a controlled feasibility and effect study among music students.</p> <p>Methods: A web-based competence development and coaching program for music students in Sweden will be developed and performed according to a cognitive approach with focus on the students own goals. The program will include knowledge concerning how to promote cognitive and emotional coping in performance situations; ergonomically sound playing postures; as well as how to prevent bodily symptoms, mental distress and hearing disorders. Participants will be music students from two regions in Sweden, Skåne and Norrbotten. The intervention group will have access to the web-based program together with web-based group coaching, while the control group will receive general web-based information. The intervention will continue for 6 month and outcome measures will be collected before, after intervention and after 12 months to evaluate the feasibility and health effects of the intervention.</p> <p>Expected outcomes: It is reasonable to believe that an increased awareness of healthy and balanced positions while playing, systematic use of pauses and variation during rehearsal, stress management skills and a sound attitude towards control of e.g. playing related fatigue and pain can improve the music students' prerequisites for a healthy and sustainable working life.</p> <p>Discussion/Conclusion: This project will contribute with knowledge about feasibility and effects of e-health solutions specifically designed for music students and musicians. Feasible and efficient e-health solutions for musicians and other performing artists can have major impact for these professions in Sweden due to the large distances and the scarceness of specialized occupational health care providers within performing arts medicine.</p> <p><i>Acknowledgement: This research is supported by the Areas of excellence in research and innovation at Luleå university of technology - Innovative art and science, who have granted funding for project initiation.</i></p>

Title	How to play the cello with fewer injuries without compromising the sound - A workshop on how to teach and learn cello playing
Author(s)	<i>Anders Grøn</i>
	<p><i>Danish cellist Anders Grøn studied at The Royal Danish Academy of Music and at the Academies of Music in Prague and in Detmold, Germany. In 1968 he played his début recital at The Odd-Fellow Palace, Copenhagen, and was met with great acclaim. The following year he has wawrded the Sonning Prize for young musicians. 1966-1978 Anders Grøn was a member of the Zealand Symphony Orchestra (Tivoli, Copenhagen), 1971-1978 as principal cellist. 1978-1981 he was a member of the Danish Radio Symphony Orchestra, and 1981-2004 a member of the Royal Danish Orchestra.</i></p> <p><i>Besides performing as a soloist and in various chamber music groups, he has an acting teaching career, having taught at the Danish Suzuki Institute and The Royal Academy of Music and been a member of The International Suzuki Cello Committee. Furthermore he has given concerts in USA, Canada and Japan. In 1990 Anders Grøn qualified as a teacher of the F.M. Alexander Technique. In 1998 he was appointed president of ESTA (European String Teachers Association), Denmark.</i></p> <p>- A workshop in how to teach cello playing – and how to learn playing cello – with a balanced focus of preventing injuries while aiming towards achieving the best possible sound. Playing traditions and playing habits may be challenged by and knowledge and common sense</p> <p>- In the workshop Anders Grøn demonstrates how to teach an experienced cello student from the Conservatory of Music as well as a beginner from a music school.</p>

Title	Singing is good for your body and soul - Or??
Author(s)	<i>Anncristine Fjellman-Wiklund (1), Susanne Hakola (1), Sanna Wiljeskén (1), Christoffer Sandell (1), Kris Chesky (2)</i>
	<p>1: Department of Community Medicine and Rehabilitation, Physiotherapy, Umeå University, Umeå, Sweden</p> <p>2: Texas Center for Music and Medicine, College of Music, University of North Texas, Denton, TX, USA</p>
	<p>Aim: The aim of this cross-sectional study was to identify and compare singer-specific health concerns to those of other musical instrumentalists.</p> <p>Methods: Data for the study were extracted from the University of North Texas Musician Health Survey (1), on which several papers have been published (2, 3). Subjects for the present study (n =349, 67% women) were included if they identified vocal as their primary instrument.</p> <p>Results: The mean number of years of college music instruction was 3.9. The mean time as professional musicians was 7.9 years. Singers were less likely to have playing related musculoskeletal disorders (PRMDs) than other musicians ($p<0.001$, 57% in singers vs 75% in other musicians), and singers reported having PRMDs, mostly localised to the upper body. The prevalence of temporomandibular joint disorders was significantly higher in singers ($p<0.001$, 25% in singers vs 13% in other musicians). Singers who practiced to fatigue were more likely to have any PRMDs. Singers had significantly more general health concerns, such as fatigue, headache, depression, anxiety, respiratory allergies, asthma and sleep disturbance, compared to other musicians ($p<0.001$). Women had more general health concerns compared to men while no significant gender differences were found in PRMDs.</p> <p>A factor analysis on general health variables yielded five factors with eigenvalues greater than 1 and explained 50.69 % of the total variance in the data. The five factors were: 1) <i>Emotional stress</i>, 2) <i>Health issues relating to voice production</i>, 3) <i>Health issues relating to the cardio-vascular system</i>, 4) <i>Work-related stress, musculoskeletal pain, maladaptive practices</i> and 5) <i>High blood pressure</i>.</p> <p>Conclusion Singers' musculoskeletal health is better than that of other musicians possibly because their body postures requires less in the way of awkward sustained positions. They do however have a greater prevalence of disorders relating to the buccal and respiratory systems. Singers also suffer more from mental stress such as depression, and anxiety.</p>
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Title	Bodily and ergonomic aspects of instrumental teaching - Can efforts to prevent physical injuries in musicians be a part of music didactic thinking?
Author(s)	<i>Annette Kibsgaard, Master in Music Teaching Theories, Musicteacher, Teacher of the Alexander Technique, Roskilde, Denmark</i>
	<p>Research question: Phenomenologically orientated research into instrumental teaching based on video observation and interviews as well as a discussion of the role of bodily and ergonomic aspects in music didactic thinking. Possibilities and restrictions with regard to prevention of physical injuries in musicians.</p> <p>The subject is based on the apparent lack of ergonomic aspects in music teaching in music didactic literature. Traditionally, the prevention and treatment of musicians' injuries have been regarded as matters for medical treatment alone. The present study looks at the one-to-one instrumental teaching situation in order to observe and discuss the responsibility of the teacher and to see if the teaching situation can be regarded as a scenario in which prevention is possible.</p>

This research is inspired by phenomenological ideas of Maurice Merleau-Ponty. It sums up three ways of understanding knowledge of the body in instrumental teaching and looks at various music didactic models and perspectives regarding bodily ergonomic aspects and the complications associated with them. I suggest framing the models in a body-phenomenological perspective in an attempt to include the bodily aspect in music didactic thinking in a wider sense than has been seen in models up to the present time.

The conclusion expresses concern that treatment and prevention occur only outside the teaching room, and suggests that change of muscular habits connected with the instrument also needs to be taken into consideration, but in the situation in which they arise. In this respect the Alexander Technique shows its potential. Instrumental teachers cannot be exempted from considering the ergonomic aspects of their teaching. In a phenomenological view there is a bodily interaction that may contribute to the pupils' health issues. Reflecting, discussing and developing strategies to take account of the various kinds of bodily knowledge and the responsibility of instrumental teachers should be emphasized as didactic tasks for relevant institutions and teachers.

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Title	Elite level adolescent athletes with Generalised Joint Hypermobility (GJH) display increased lower extremity symptoms and larger postural sway than those without GJH
Author(s)	Juul-Kristensen B ^{1,2} , Schmidt H ¹ , Lykke Pedersen T ¹ , Nicholson L ³ , Engelbert RHH ^{4,5} , Junge T ^{6,7}
	¹ Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense, DK, ² Bergen University College, Institute of Occupational Therapy, Physiotherapy and Radiography, Department of Health Sciences, Bergen, Norway. ³ Discipline of Biomedical Science, School of Medical Sciences, Sydney Medical School, The University of Sydney, Australia, ⁴ Education of Physiotherapy, University of Applied Sciences Amsterdam, Amsterdam, The Netherlands, ⁵ Department of Rehabilitation, University Hospital Amsterdam (AMC), Amsterdam, The Netherlands, ⁶ Health Sciences Research Centre, University College Lillebaelt, Denmark. ⁷ Institute of Regional Health Services, University of Southern Denmark, Odense, Denmark
	Introduction: Generalised Joint Hypermobility (GJH) affects pain, physical functioning and health related quality of life (HRQoL) in the general population, but these relations have not been explored in elite performers as ballet dancers and athletes.
	Aims: The aim was to investigate whether adolescent elite performers with GJH had higher injury frequency, reduced lower extremity physical functioning and HRQoL than non-GJH (NGJH).
	Methods: Totally, 132 adolescents (36 males; 96 females), aged 14.01 (0.88) years, participated (n=22 ballet dancers, n=57 gymnasts, n=53 handball players). GJH was defined by the Beighton score (BS) (GJH4: BS ≥ 4/9, GJH5: BS ≥ 5/9, GJH6: BS ≥ 6/9). Questionnaires comprising injuries (latest month), lower extremity physical functioning and HRQoL (RAOS-Child) were used. Dynamic and static motor competence was tested with one-leg hop (OLH), three consecutive cross-over hops (COH), as well as four postural sway tests (bilateral and unilateral stance with open (1OE, 2OE) and closed eyes (2CE, 1CE)) measured as sway length and Center of Pressure Path Length (COPL).

Results: Prevalence of GJH4, GJH5 and GJH6 was 27.3%, 15.9% and 6.8%, respectively, with the highest prevalence in ballet. There was no significant difference between GJH and NGJH in injury frequency, lower extremity functioning and HRQoL. However, GJH5 had lower RAOS symptom score ($p=0.027$), and shorter OLH ($p=0.032$). COPL in bilateral stance was increased in all GJH groups (2OE; GJH4: $p<0.001$; GJH5: $p<0.001$; GJH6: $p=0.015$. 2CE; GJH4: $p<0.001$; GJH5: $p<0.001$; GJH6: $p=0.014$). In unilateral stance, GJH4 had increased COPL (1OE; GJH4: $p=0.022$), and GJH5 had fewer completed trials (1CE; $p=0.006$) than NGJH.

Discussion/Conclusion: GJH was most prevalent in ballet dancers. Elite level adolescents with GJH were not more prone to self reported injuries, or decreased HRQoL than NGJH, but presented with more lower limb symptoms. Even among elite performers those with GJH demonstrated increased sway in bilateral stance and were able to complete fewer unilateral sway trials. Longitudinal studies of the consequence of GJH are indicated.

06

Title Network for health for performing arts in Trondheim, Norway

Author(s) Anna Grønskag¹, Toril Nilsen¹, Idun Alma Ramsdal¹, Bjørn Hilt^{1,2}
Presenting author: Bjørn Hilt.

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Introduction: Trondheim is the third largest city in Norway with a relatively large university and a diverse cultural life including many different performing arts. The university offers education for both singers and musicians. In the network we include the university and cultural institutions of performing arts as well as different health professionals like occupational health services, occupational health physicians, an ear-nose-throat physician, a psychiatrist, psychologists, speech therapists, physiotherapists, and pulmonologists. Together we will offer both long term preventive and rapid curative health care to performing artists whenever needed and in accordance with their sometimes special needs. The Department of Occupational Medicine at the University Hospital will take the role as a hub in the network and offer guidance and advice to artists who don't know where to turn while the other specialists will be open to help with specialized services within their fields. In case of multiple health challenges the different specialists will be able to consult with, and refer to each other.

Aim: Upon initiative from employees in two orchestras and a theater in Trondheim, Norway, we have started to build an inter-disciplinary network to offer both preventive and curative health care to performing artists in Middle-Norway. The aim of this presentation is to describe our goals and organization, and to get useful feedback.

Presentation: With acquired knowledge about working conditions of performing artists and the physical and psychological demands they face both from inside and outside, we will together try to start preventive programs for different groups. Based on the joint experiences within the network we also, in time, aim to start relevant research projects on our own and/or join international research projects. The network will have regular meetings for updates and exchange of experiences, and we are keen to learn from similar projects in other parts of the world.

07

Title Body stabilization and its effects in music performance from the musicians' point of view

Author(s) Dr. Carina Joly, DMA in Piano Performance and Pedagogy, CAS - Certificate of Advanced Studies in Music Physiology, Independent Researcher

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With the goal of strengthening the communication between musicians and health care professionals, the impressions of musicians after trying a new postural behavior during the musical activity will be shared. In this ongoing study, workshops/masterclasses proposing a preventive approach towards music performance through the introduction and application of basic principles of body stabilization are presented to students and teachers of music departments in universities and conservatories. During a minimum of one hour and a maximum of six hours, participants experience a selection of exercises designed to activate and/or strengthen core muscles and to bring higher awareness towards a more

stabilized posture in seated and standing positions. Video recordings of volunteers performing before and after the workshops allow for both audience members and volunteers to compare the performances. Participants are encouraged to implement the exercises into their daily practice and performance routines. Quantitative data is collected at the end of the presentations through a questionnaire designed to investigate the participants' immediate impressions on the relationship between body stabilization and its effects in music performance. A second email survey is applied to participants who express an interest in providing feedback after implementing the proposed exercises into their practice/performance routines.

Upon the application of the study in workshops/masterclasses given in Brazil, Slovenia, Germany and the US between November 2013 and February 2014, it is possible to share (Tables below):

The application of body stabilization principles in daily musical practice can serve as an effective preventive strategy and may assist musicians to better cope with stage fright. The demonstration of immediate positive results into musical performance may encourage a greater number of musicians to seek a healthier postural behavior before an injury occurs.

1st Questionnaire Participants' Observations (66 participants)

Agree that body stabilization can help musicians to play better.....	96.43%
Observed immediate postural changes in the volunteers.....	85.72%
Observed immediate improvement in the sound quality.....	91.17%
Observed progress in the technical control.....	64.74%

2nd Online Survey Participants' Observations (28 participants)

Reported "the pain or physical discomfort I used to experience while practicing has subsided".....	53.84%
Reported higher levels of freedom and comfort during the musical activity.....	77.42%
Reported to be able to better cope with stage fright.....	60%

Keynote speaker

08

Title	Physiotherapy-based interventions, hypermobility assessment and holistic management.
Author(s)	<i>Cliffon Chan, Sydney, Australia</i>
The literature identifies consistently high prevalence of playing-related musculoskeletal disorders in musicians. However, there is little available evidence to guide specific injury management approaches. This presentation will discuss a holistic evidence-informed physiotherapy strategy to manage playing-related musculoskeletal disorders in this hyper-functioning population. A particular focus will be placed on the assessment of upper-limb hypermobility and special considerations in the management of hypermobility in musicians.	

09

Title	Effects of Fitness training and Yoga training on musicians' health and wellbeing: Preliminary results.
Author(s)	<i>Cinzia Cruder^{1,3}, Marco Barbero², Hubert Eiholzer¹, Aaron Williamon³</i>
¹ Conservatory of Southern Switzerland, Lugano, Switzerland	
² Department of Business, Health and Social Care, University of Applied Sciences and Arts of Southern Switzerland (SUPSI), Manno, Switzerland	
³ Centre for Performance Science, Royal College of Music, London, United Kingdom	
Aims: This study focused on the effects of Fitness training (FT) and Yoga training (YT) with regard to musculoskeletal injuries, flexibility, cardiovascular condition and health behaviour in professional music students.	

Methods: Twenty-nine musicians (17 women, 14 men; mean age=23.74 years; SD=2.73) were randomized into the FT (n=15) and YT groups (n=14). All participants completed 10 weeks of training lessons twice a week consisting of one hour each. Musculoskeletal problems were measured using the Performance-related Musculoskeletal Questionnaire-Extended (adapted from Nordic Musculoskeletal Questionnaire-Extended); flexibility was measured by the Sit and Reach Test; and cardiovascular fitness was measured with a 3-min Step Test. Finally, healthy behaviour was measured using the Health Promoting Lifestyle Profile II (HPLP II). The outcomes were compared at baseline and after 10 weeks, once all training was complete.

Results: The preliminary results indicates that reports of musculoskeletal problems were significantly reduced for both groups after their training. Flexibility improved significantly for the YT group, and cardiovascular fitness improved significantly for the FT group. Finally, healthy behavior improved after both sets of training, with more changes in the attention toward physical activity and nutrition habits for the FT group and more changes in self-awareness for the YT group.

Conclusions: The interventions both showed potential to reduce musculoskeletal problems and to improve participants' health and wellbeing. As expected, flexibility was mostly improved after Yoga training and cardiovascular fitness after Fitness training. These preliminary findings will be verified by further investigations employing larger samples. Given the physicality of musicians' work, those who set the curricula in music schools should consider such interventions for changing health behaviour and individual musicians' attitudes toward the role of health promotion in making music.

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Title	Physiotherapeutic clinic for musicians' health at the INAP/O – the importance of neuromusculoskeletal problems and how to treat them adequately
Author(s)	Christoff Zalpour, Nikolaus Ballenberger University of Applied Sciences Osnabrueck, Germany
<p>Introduction: The Institute of Applied Physiotherapy and Osteopathy (INAP/O) belongs to the University of Applied Sciences Osnabrueck /Germany (UASO) and offers a few services (workplace health promotion, post traumatic rehabilitation, regular physiotherapy in prevention and healthpromotion) including a physiotherapeutic clinic dedicated to performing artists (instrumentalists, singers and dancers) since 2007. Besides regular physiotherapeutic diagnosis and treatment of musicians (external professionals, students, teachers) classes in music physiology (according to the recommendations of the <i>Deutsche Gesellschaft für Musikphysiologie und Musikmedizin</i>, DGfMM [the German association for music physiology and performing arts' medicine]) are offered to all music students at UASO.</p> <p>Aims: After a first evaluation of the first consecutive 200 patients coming in, (descriptive analysis of data was presented in Sydney/AUS 2012, Havana/CUB 2013) it was now time to sum up the results of a bigger sample, approximately 600 patients from different music genres (Classic, Jazz, Pop, Rock), patients seen until 2014.</p> <p>Presentation is based on: The service was free-of-charge and was widely accepted among the students. Demands on both advice and special treatment were growing fast. One finds a wide distribution of different instruments, and heterogeneity in different physio treatment approaches including manual therapy, joint mobilisation, myofascial techniques as well as strengthening, relaxation, ergonomic advice and neural mobilisation.</p> <p>The physiotherapy clinic for instrumentalists, singers and dancers at the INAP/O is an established „institution“ which serves the special needs of students, teachers and external professionals. A crucial detail for high quality service is, that all therapists have a musical background themselves. High levels of performance (from either sports or culture) quite obviously need special service from physiotherapy, sometimes on a daily basis.</p>	

Title	Violinist in Balance
Author(s)	Crissman Taylor
	<i>Utrecht School for the Arts, The Netherlands</i>
	<p>The violinist and violist must support his instrument without compromising poise and freedom of movement. Traditional equipment often endangers comfort, cramps jaw, neck and shoulders, provides limited support, and forces the head out of alignment with the spine. Discomfort and awkwardness arises partly from responses to ill-fitting chin rests and shoulder rests. The result compromises coordination, balance and even perception.</p> <p>An interdisciplinary team from the Netherlands developed <i>Violinist in Balance</i>, which meets ergonomic and psychophysical challenges facing violinists and violists. Initial research at the Utrecht Conservatoire continues through pilot studies in England at <i>Royal College</i> and the <i>Oundle School</i> (with children), and a two-decades experience with international private clients, many from major orchestras.</p> <p>The approach starts with ergonomic playing assessments that lead to creation of custom equipment sets and re-training of cramped playing habits. After years of playing in a cramped position, we find that player can benefit from a program of training to rediscover his true stature (Alexander Technique). Equipment design realigns instrument position to natural joint movements.</p> <p>We will discuss common physical problems encountered in the field and present new basic principles of education, ergonomics and anatomy for violin and viola playing. We will describe training programs for teachers and equipment series for children, new measuring equipment and techniques including 3D printed fitting kits for chin rests, and collarbone rests.</p> <p>We aim to throw some light on the educational gaps in the training of young musicians and teachers of the violin and viola, and to continue our dialogue with the medical and musical professions.</p>
References	www.artistinbalance.org www.violinistinbalance.nl

Title	
Author(s)	Dag Rissén (1, 2), Annacristine Fjellman-Wiklund (3), Ulrik Röijezon (4)
	<p>1 Centre for Research & Development, Uppsala University/Region of Gävleborg, Gävle, Sweden</p> <p>2 Centre for Musculoskeletal Research, Department of Occupational and Public Health Sciences, Faculty of Health and Occupational Studies, University of Gävle, Gävle, Sweden</p> <p>3 Department of Community Medicine and Rehabilitation, Physiotherapy, Umeå University, Umeå, Sweden</p> <p>4 Department of Health Science, Luleå University of Technology, Luleå, Sweden</p>
	<p>Title: Prevalence, intensity, and playing related consequences of musculoskeletal pain, and associations with mood among professional orchestra musicians – a pilot study</p> <p>Aim: The aim of this cross-sectional study was to examine the 7-day prevalence, intensity, and consequences of musculoskeletal pain in the upper part of the body among professional musicians. Additional aims were to examine subjective mood and associations between mood and pain.</p> <p>Methods: This study is part of an ongoing national survey on musculoskeletal health conditions among professional musicians in Swedish symphony and opera orchestras. The data of this report is collected from two orchestras. Seventy-eight musicians (80%) participated, aged 45 ±9.6 years and 41% women.</p> <p>Results: Eighty percent of the musicians reported pain during the last 7 days. Pain was most frequent in the neck (59%) and the right shoulder (36%). The intensity of pain (11-point scale) was highest in the neck (mean 2.7, SD 1.8) and in the right hand (mean 2.7, SD 1.9). Playing related consequences were particularly related to pain in the left (71%) and right (54%) hands, and pain located to the left upper extremity did relatively more often affect playing performance compared to right side pain. Mood ratings showed that the musicians to a higher degree experienced “positive mood” (stimulated, concentrated, happy) compared to “negative mood” (stressed, exhausted, tense, nervous/anxious). Significant positive correlations were found between neck pain and stressed ($\rho=0.501$, $p=.000$); neck pain and exhausted ($\rho=0.318$, $p=0.033$); neck pain and tense ($\rho=0.314$, $p=0.034$); and neck pain and nervous/anxious ($\rho=0.346$, $p=0.019$). Significant</p>

correlations were not found between mood and pain in any other body region, except for a positive correlation between right shoulder and exhausted ($\rho=0.384$, $p=0.048$).

Conclusion: These preliminary results show a high 7-day prevalence of pain among professional musicians, especially in the neck. Left upper extremity and left and right hand pain needs special clinical attention due to high impact on playing performance. The results concerning associations between perceived “negative mood” and neck pain are supported by earlier findings (1,2) but need further exploration.

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2: Hanvold, TN, Waersted, Mengshoel, AM, Bjertness, E, Twisk J, & Veiersted, KB. (2014). A longitudinal study on risk factors for neck and shoulder pain among young adults in the transition from technical school to working life. *Scand Journal of Work, Environment & Health*, 6, 597-609.

Title Plan your practicing and prevent injuries

Author(s) Erja Joukamo-Ampuja

Sibelius Academy, Finland

Aims: “Musician’s Health and Wellbeing” is a course for incoming students at the Sibelius Academy. It includes lectures about musculoskeletal awareness and physical aspects of the body from a musicians’ perspective. The content includes knowledge about physical recovery and how to plan practicing from this perspective. This course has enabled many students to avoid physical problems related to their playing. The lecturers are doctors specialized in music medicine, as well as physiotherapists and musicians such as myself.

Methods: The body is “the other half of our instrument”, requiring the “artistic musician” and the “biological musician” to work together. During the student years in particular, it is beneficial to divide physical practicing into periods. These can be planned as periods of weeks or up to a year. It is also important to vary daily practicing and to take care of sufficient recovery. Practice periods (for example of a month) can be linked to previous exercises, improved attributes, and other things previously learned. Long-term practice fosters development and enables skills to improve as desired. The cornerstones of practice are continuity and systematic planning. Progressive practice gradually increases endurance and prepares the musician for more demanding competition and performance situations, having an effect also on self-confidence.

Results: Many students have been interviewed during years 2005-2014. After learning to vary their practicing days and plan their long term practicing students have noticed that they have developed their endurance and strength in playing, they have been able to time their practicing better before the performances, planning has helped them to avoid overtraining and pain, they have felt less guilty in their free time, they have been more focused on practicing and they have been more aware of their physical and mental condition.

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www.siba.fi/harjoittelu

Title	The lost embouchure – brass player's challenge
Author(s)	Erja Joukamo-Ampuja, Music Licentiate Degree; Lecturer of Horn and Pedagogy, Sibelius Academy; Adjunct Professor, University of Griffith, Brisbane, Australia. Miikka Peltomaa, MD, PhD; Otolaryngology, Head and Neck Surgery; Special Competence in Musicians' Medicine; Adjunct Professor, University of Helsinki
	<p>Introduction: The whole body from top to toe is needed for the successful brass playing. The concern of the player is often focused on the embouchure when the playing does not work. There is no doubt that the face, mouth and lips play an important role in brass playing. The embouchure consists of most diverse collaboration of lungs, mucous membranes, skin, muscles, nerves, bones and brain. The non-working embouchure is a most diverse and challenging medical and pedagogic problem, as well as a mental challenge for a musician.</p> <p>Presenters: The presenters of this talk are experienced professionals in brass playing and medicine. Erja Joukamo-Ampuja as a French horn player and professor and Miikka Peltomaa as an ENT-specialist (and as an amateur horn player) have collaborated for many years in solving embouchure problems in brass players. They also teach musicians' health issues in the Sibelius Academy (University of the Arts) in Helsinki.</p> <p>Presentation: In this talk the presenters enlighten the art of brass playing, share their experience of facing the brass player with embouchure dysfunction and show how the patient benefits from the collaboration of the brass teacher and a medical doctor.</p>

Title	Musicians and mental health
Author(s)	Esther van Fenema
	<p>Aim: scientific and clinical update on mental health problems among musicians. Raise awareness for specific psychiatric symptomatology due to occupational stress, special personality traits, and coping skills.</p> <p>Methods: routine outcome monitoring (ROM) data on clinical and psychosocial characteristics were collected from the first 50 musicians visiting our outpatient psychiatric clinic for performing artists and were compared to those of a large sample of psychiatric outpatients ($n=1,498$) and subjects from the general population.</p> <p>Results: Of the musician outpatients, 82% ($n=41$) met the criteria of an Axis I psychiatric disorder. Performance anxiety could not be accurately diagnosed with the MINI-plus, and in a few cases it masked different psychiatric disorders. Musician outpatients scored significantly better on functional scales despite their Axis I disorder, with equal scores on scales measuring distress compared to general outpatients. Musicians displayed significantly higher mean scores on the DAPPSf subscale measuring narcissistic personality traits than general outpatients and non-patient controls ($p=0.001$).</p> <p>Discussion: Diagnostic challenges, in particular regarding performance anxiety, of musicians seeking psychiatric care will be thoroughly discussed. Musicians with psychiatric disorders may constitute a group of patients with specific characteristics who may benefit from specialized psychiatric care, and health professionals should be aware of the high prevalence of psychiatric disorders in musicians.</p>
References	Van Fenema et al., <i>Med Probl Perform Art</i> 2013; 28(1): 9–18.

Title	Are your body and instrument in a duet or a duel?
Author(s)	Grete Ege
	<i>University of Bergen, The Grieg Institute of Music</i>
	<p>Aims: The main aim is to give the participants of the workshop some experience and increased awareness of movement and body through practical exercises. The content of the workshop will provide the participants with more knowledge about the connection between playing music and the body awareness. The benefit for the participants of the workshop is an increased knowledge on the possibilities in the hands of the musicians themselves to avoid overuse injuries.</p> <p>Methods and results: The method is based on Evidence-based practice. The three parts of Evidence –based practice is: research, experience and user interaction. In this case this means the combined research from different relevant fields. The leader of the workshop holds the relevant experience based on her many years of work with education and guidance of music students. The third element is user interaction that has been practised with music students giving evaluation each year on the subject Music physiology. The workshop will start with a short lecture to provide the participants with broad knowledge related to the theme music and body. Examples of themes are: anatomy and physiology, overuse injuries for musicians, theory from the Health, Safety and Environment field, music physiology and physiotherapy. The participants will be invited to practice general movements of importance for the way musicians play their instruments, like sitting and standing posture. The focus will be on awareness and body consciousness. Finally the participants will be invited to do different physical exercises, relaxation positions and relaxation techniques.</p> <p>Discussion: Strain injuries are a large and complex field. There are many different methods to promote musicians health. In this workshop the greatest focus is on gaining experience with some practical exercises and recognizes how the different movements are perceived within the body. What does it feel like to be in a duel or duet with your body?</p>
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Title	Musculoskeletal problems in symphony orchestra musicians – and how to map them
Author(s)	Helene m. Paarup, MD, PH.D.
	<p><i>Research Unit of Occupational and Environmental Medicine, Clinical Institute, Faculty of Health Sciences, University of Southern Denmark.</i></p> <p><i>Department of Occupational and Environmental Medicine, Hospital of South West Jutland, Esbjerg</i></p>
	<p>Symphony orchestra musicians' working conditions and musculoskeletal problems are both very comprehensive subjects. This lecture is held as an introduction to the Musicians' Health & Performance conference and with</p> <ul style="list-style-type: none"> • the working conditions of the musicians, in particular of the symphony orchestra musicians – in a modern and historical perspective - and • background information on perspectives on musculoskeletal problems in focus.

Title **Freelance musicians in Denmark: Musculoskeletal complaints**
Author(s) *Jesper Bælum, Helene M Paarup, Ellen Raben Pedersen, Jesper Hvass Schmidt.*

In Denmark jazz and rock musicians and partly also classical musicians normally work freelance with limited social security. Whether this has any impact on the complaints from the musculoskeletal system has not been studied.

From the Musicians Trade Union we received a list of the 1,722 persons registered as full time ensured for unemployment. A comprehensive questionnaire was sent to these persons in March 2011. The questionnaire included items from the Nordic Questionnaire on Musculoskeletal Complaints about, neck, lower back, shoulders, and hands.

A total of 561 (33%) responded after two reminders, 344 (60 %) by internet and 223 (40 %) by mail. Responders were 445 (79%) males aged 24 to 65 years (mean 44.5 years) and 118 (21%) females aged 27 to 68 years (mean 39.7 years). They had in average played on their main instrument for 26 (1 to 40) years.

Table 1 shows the prevalences of complaints, duration as well as sick leave for each region. It shows that complaints are very frequent with neck and lower back as the most prominent. In all regions women have more complaints than men. There is a discrepancy between the duration of complaints and sick leave indicating a high threshold for sick leave.

Compared to orchestra musicians' complaints are at the same level for each sex. However, the duration is a bit shorter and long term sick leave infrequent. The frequency of complaints is still higher than the reported by the general workforce.

Freelance musicians in Denmark have frequencies of musculoskeletal complaints comparable with those of classical orchestra musicians and considerably higher than the general work force.

Table 1

Males N=309	Neck	Lower back	Left shoulder	Right shoulder	Left hand	Right hand
Symptoms <u>within 12 months</u>	53 %	59 %	24 %	24 %	26 %	31 %
Symptoms <u>more than 30 days</u>	13 %	11 %	8 %	8 %	6 %	6 %
Sick leave <u>more than 7 days</u>	1 %	2 %	2 %	1 %	1 %	0 %
Females: N=96						
Symptoms <u>within 12 months</u>	79 %	61 %	31 %	28 %	20 %	27 %
Symptoms <u>more than 30 days</u>	25 %	17 %	11 %	9 %	7 %	11 %
Sick leave <u>more than 7 days</u>	3 %	2 %	3 %	2 %	1 %	1 %

Title **Freelance musicians in Denmark: Working conditions**
Author(s) *Jesper Bælum, Helene M Paarup, Ellen Raben Pedersen, Jesper Hvass Schmidt.*

In Denmark jazz-rock musicians and partly also classical musicians normally work freelance without any secure employment and limited social security. This group has only to a limited extend been investigated in contrast to the classical orchestra musicians and the present study the social conditions and wellbeing of Danish freelance musicians.

From the Musicians Trade Union we received a list of the 1,722 persons registered as full time ensured for unemployment. A comprehensive questionnaire was sent to these persons in March 2011. A total of 561 (33%) responded after two reminders, 344 (60 %) by internet and 223 (40 %) by mail. No difference between responders and non-responders according to sex, age, region of residence, or reported main instrument was seen.

Responders were 445 (79%) males aged 24 to 65 years (mean 44.5 years) and 118 (21%) females

aged 27 to 68 years (mean 39.7 years). They had in average played on their main instrument for 26 (1 to 40) years and 445 (80%) had a degree from a musical academy. 449 or 80% had at least one performance per month, in average 5.4 (1 to 60) jobs. They reported a work week of 30.0 (1 to 68) h consisting of performance (4.0 h), individual practice (5.9 h), group rehearsals (4.7 h), and other musical work (5.6 h).

However, 60 % of the respondents reported having other work, of these 29% had work not related to music either fulltime or part time. Dependence on social benefits could not be revealed from the questionnaire.

Freelance musicians in Denmark can only to some extent live by their music and they are dependent of other types of income. Many musicians have employment as musical teachers or in organisations, but a large part also need other types of income.

Plenary speaker

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Title **Hearing loss and hearing symptoms of musicians in relation to sound exposure.**

Author(s) *Jesper Hvass Schmidt, Odense, Denmark*

Hearing loss, tinnitus and hyperacusis among symphony orchestra musicians and how these disorders are related to the sound exposure in the orchestra. Identifying differences and similarities in sound exposure in the symphony orchestras and in an opera choir.

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Title **Occupational medicine and the symphony orchestras**

Author(s) *Jesper Rasmussen, head of department, MD, PhD, specialist in occupational medicine
Department of Occupational and Environmental Medicine, Hospital of South West Jutland, Esbjerg*

Workshop on occupational medicine in context of Musicians' Health - does it fit in?

- Yes, how?
- No, why not?

Topics in the workshop includes:

Population focus, hazards, causation, seeing the patient in context of work, prevention. And examples from the Symphony Orchestras

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Title **Symptoms of Anxiety and Depression Among Norwegian Musicians Compared to the General Workforce**

Author(s) *Vaag, J.¹ Bjørngaard, J.H.,^{2,3} & Bjerkeset, O.^{4,5}*

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² Norwegian University of Science and Technology, Faculty of Medicine, Department of Public Health and General Practice, Trondheim, Norway

³ St. Olav's University Hospital Trondheim, Forensic Department and Research Centre Brøset, Trondheim, Norway

⁴ Faculty of Health Sciences, Nord-Trøndelag University College (HiNT), Levanger, Norway

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Aim: In order to investigate mental health problems among professional musicians, we estimated the prevalence of symptoms of anxiety and depression (psychological distress) among musicians compared to the general workforce.

Methods: A total sample of 1,607 musicians from the Norwegian Musicians Union answered an online questionnaire about demographic characteristics, lifestyle and symptoms of anxiety and depression. They were compared to a sample of the Norwegian workforce ($n = 2,550$) drawn from the Norwegian survey of level of living 2012. Based on logistic regression analysis adjusting for age, sex, education level, smoking status, alcohol usage, use of drugs, physical exercise and financial

status, we compared anxiety and depression symptom levels in musicians to a variety of professions.

Results: Psychological distress was more prevalent among musicians than in the total workforce sample (aOR 2.35 (1.82-3.03), aPD 8.2 (5.6-10.8)). Solo/lead performers (aOR 2.63 (1.88-3.69)), vocalists (aOR 2.68 (1.88-3.82)), keyboard instrument players (aOR 3.00 (2.00-4.50)) and musicians playing within the traditional music genre (aOR 3.72 (2.17-6.36)) reported the highest prevalence.

Conclusions: Further research needs to map the psychosocial and personal factors contributing to the higher degree of depression and anxiety symptoms among musicians, as well as establishing evidence-based preventative measures.

Poster

23

Title	Use of Psychotherapy and Psychotropic Medication Among Norwegian Musicians Compared to the General Workforce
Author(s)	Vaag, J. ¹ Bjørngaard, J.H., ^{2,3} & Bjerkeset, O. ^{4,5}
	¹ Nord-Trøndelag Health Trust, Department of Psychiatry, DPC Stjørdal, Remyrvegen 37, 7500 Stjørdal, Norway ² Norwegian University of Science and Technology, Faculty of Medicine, Department of Public Health and General Practice, Trondheim, Norway ³ St. Olav's University Hospital Trondheim, Forensic Department and Research Centre Brøset, Trondheim, Norway ⁴ Faculty of Health Sciences, Nord-Trøndelag University College (HiNT), Levanger, Norway ⁵ Norwegian University of Science and Technology, Faculty of Medicine, Department of Neuroscience, Trondheim, Norway
	AIM: Previous research has reported higher prevalence rates of anxiety and depression among musicians, compared to the general workforce. We compared the use of psychotherapy and psychotropic medication with other major occupational groups, and expected to find higher use among musicians.
	METHODS: 1,607 musicians from the Norwegian Musicians' Union answered an online questionnaire about demographic characteristics, mental health, personality, psychosocial work environment, life style, use of healthcare services and use of psychotropic medication. They were compared to a sample of the Norwegian workforce (n=2,550) from the Norwegian survey of level of living. We used chi-square and logistic regression analysis, both crude and adjusted for age, sex, education and cohabitation status.
	RESULTS: After adjustment, musicians reported higher use of psychotherapy (adjusted OR 2.86 (2.11-3.88), aPD 5.8 (3.2-7.7)) and psychotropic medication (aOR 1.55 (1.19-2.02), aPD 3.5 (1.3-5.7)). Use of psychotherapy was reported most frequently among vocalists (aOR 3.86 (2.60-5.72), aPD 11.0 (6.2-15.8)), while rock musicians (aOR 4.45 (2.46-8.05), aPD 20.0 (8.4-31.7)) reported the most widespread use of psychotropic medication, compared to the general workforce.
	CONCLUSIONS: Overall, musicians had 3-fold higher odds of use of psychotherapy and 50% higher odds of use of psychotropic medication compared to the general workforce. This is consistent with previous findings indicating high rates of sleep-difficulties and psychological distress among musicians. The results underline the importance of investigating both the content and quality of services provided.

Poster

24

Title	Sleep Difficulties and Insomnia Symptoms in Norwegian Musicians Compared to the General Population and Workforce
Author(s)	Vaag, J., ¹ Saksvik-Lehoullier, I., ² Bjørngaard, J.H. ^{3,4} & Bjerkeset, O. ^{5,6}
	¹ Department of Psychiatry, DPC Stjørdal, Remyrvegen 37, 7500 Stjørdal, Norway ² Norwegian University of Science and Technology, Faculty of Social Sciences and Technology Management, Department of Psychology, Trondheim, Norway ³ Norwegian University of Science and Technology, Faculty of Medicine, Department of Public Health and General Practice, Trondheim, Norway ⁴ St. Olav's University Hospital Trondheim, Forensic Department and Research Centre Brøset, Trondheim, Norway ⁵ Nord-Trøndelag University College (HiNT), Faculty of Health Sciences, Levanger, Norway ⁶

Aim: Sleep problems are reported as common among performing artists and musicians. However, epidemiological research comparing musicians to different groups of the general population is lacking.

Methods: 4,168 members of the Norwegian Musician's Union were invited to an online survey regarding work and health. Of the 2,121 (51%) respondents, 1,607 were active performing musicians. We measured prevalence of insomnia symptoms using the Bergen Insomnia Scale (BIS), and compared this sample to a representative sample of the general Norwegian population (n=2,645).

Results: Overall, musicians had higher prevalence of insomnia symptoms compared to the general population (Prevalence Difference 6.9, 95% Confidence Interval 3.9- 10.0). Item response analysis showed that this difference was mainly explained by nonrestorative sleep and dissatisfaction with sleep among musicians. An additional analysis, comparing musicians to the general Norwegian workforce (n=8,518) on sleep difficulties, confirmed this tendency (Prevalence Difference 6.2, 95% Confidence Interval 4.3-8.1).

Conclusions: Musicians performing classical, contemporary, rock, and country music reported the highest prevalence of insomnia, and these genres might be of special interest when developing preventative measures, treatment strategies and further research on sleep difficulties among musicians.

Title **The Alexander Technique, a means to avoid injuries and improve performance**

Author(s) *Kim Eriksen, ITM Alexander Technique Teacher, Professional Pianist*
Denmark

Musicians get many instructions from their teachers and health professionals regarding how to use their fingers, arms, shoulders, back, head etc. However, the degree to which musicians succeed in carrying out these instructions is very much dependent upon their general use of themselves. If their general use is good, then the musicians will be able to do what is asked for. If their general use is poor, then they will add in counterproductive movements and tensions. As most musicians are very ambitious and disciplined, they will work hard to cultivate the new instructions, until they become a subconscious habit. At some point in their career they will have so many habits that it begins to be a problem for health and performance. The Alexander Technique (AT) teaches you how to deal with habit, how to improve your general use and how to direct yourself in activity so that you are actually doing what the teacher or health professional is asking for. (5,6).

In the last couple of decades the interest for scientific research of AT has increased. Among musicians AT has been popular for years as a means to alleviate playing-related musculoskeletal problems and facilitate performance (1,2). Many major music conservatories offer AT to their students. Among musicians improvements in performance after AT lessons have been objectively assessed (1,3). AT is known to affect different aspects of motor behavior and can result in changed postural regulation when standing as well as in increased adaptability of muscle tone - and posture changes and reduced muscle activity have been demonstrated (1,4).

The workshop will demonstrate the Alexander Technique on volunteers, preferably musicians (bring your instrument).

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 - 5: Alexander, Frederick Matthias, 4 books from Chaterson Ltd., London: Man's supreme inheritance, Constructive conscious control of the individual, The use of the self, Universal constant in living.
 - 6: Donald L. Weed, D.C.: What you think is what you get, ITM Publications 2004

Title	Clinic of Performing Arts Medicine, Odense University Hospital: Experience from the two first years.
Author(s)	<i>Lars Brandt MD, PhD</i>
	<i>Clinic of Performing Arts Medicine/Department of Occupational and Environmental Medicine, Odense University Hospital, Denmark.</i>
<p>Aim: To describe the background, start and organization of, and the patients seen at Clinic of Performing Arts Medicine Odense University Hospital.</p> <p>Methods: Data from patient records are compiled in a clinical patient data base for the purpose of performing descriptive analyses of musicians work exposures, resulting diseases, as well as the effects of treatment and intervention.</p> <p>Results: Research on occupational exposures and diseases among musicians was initiated by Odense University Hospital and University of Southern Denmark in 2006 and resulted in two PhD thesis (x,y): During this research the musicians and Danish Musician's Union appealed for a specialized medical clinic for musicians, one place to go. Therefore Odense University Hospital established the Clinic of Performing Arts placed in Dept. of Occupational and Environmental Health. The clinic opened June 2013. The staffs consist of two specialists in occupational medicine, one psychologist, one physiotherapist, one secretary, and a medical audiologist from Dept. of Audiology. 166 musicians have been examined, 45 % were women and 55% men. The most predominant health complaint was musculoskeletal pain and dysfunction (53%) and second tinnitus (12%). 5.5% were referred due to psychological conditions. 23% had previously been on sick leave and 6% were on sick leave at the time of consultation. The most predominant diagnose was neck and shoulder pain (42%) of whom 50 % were among string players. Tinnitus was most frequent among brass players (56%) and secondly most frequent among string players (28%).</p>	

Plenary speaker

Title	Effect of physical exercise on work-related pain in the neck, shoulder, and arm.
Author(s)	<i>Lars Louis Andersen, Copenhagen, Denmark</i>
<p>Neck and shoulder pain bothers app. 30% of working-age adults, and the prevalence is even higher among certain occupationale groups. Many musicians experience pain and soreness of the neck, shoulder and arm muscles after prolonged work. During recent years we have performed at number of workplace studies to assess different strategies to prevent and reduce pain in the neck, shoulders and arms in different occupational groups. One common finding from these studies is that strength training of the painful muscles help relieve the pain. Most studies have used 3 by 20 minutes per week training protocols, but one of the studies showed that as little as 2 minutes of daily strength training with elastic bands can also be beneficial. The results of these studies along with physiological mechanisms of adaptation and relevance for musicians will be presented.</p>	

Title	Selected physical characteristics and playing-related musculoskeletal problems (PRMP) in German adolescent string instrumentalists
Author(s)	<i>Leoni Winter, Christoff Zalpour, Sonia Ranelli</i>
<p>Aims: The performing arts medicine literature reports high prevalence rates of playing-related musculoskeletal problems (PRMP) among adult and child musicians, with highest rates among string instrumentalists . Despite the large number of musicians in Germany, little is known about PRMP prevalence and associated factors in young German musicians. This study aimed to: establish prevalence rates for both playing-related musculoskeletal symptoms (PRMS) and playing-related musculoskeletal disorders (PRMD); compare prevalence rates between upper and lower string instrumentalists, and examine the relationship between selected physical characteristics of BMI, hypermobility and hand span with PRMP in a group of German adolescent string instrumentalists.</p> <p>Methods: Sixty-seven string instrumentalists aged 10 to 21 years (38 upper, 29 lower strings) from the music school Musik- und Kunstschule Osnabrück were surveyed using a modified version of the</p>	

Young people's Activity Questionnaire (YAQ-m). Body mass index (BMI), joint mobility (Beighton scale) and hand span were measured. Prevalence rates of PRMS and PRMD within the last month were calculated and compared using chi square, and logistic regression examined the association of physical measures.

Results: 68.7% reported the experience of a PRMS and 7.6% reported the experience of a PRMD within the previous month. There was no significant difference in PRMP prevalence between instrument groups. The experience of non-music musculoskeletal soreness (OR 6.20, 95%CI 1.53 to 24.27, $p=0.010$) and decreased right hand span (OR 0.59, 95%CI 0.36 to 0.955, $p=0.032$) was significantly associated with PRMP after adjusting for age, gender and covariates.

Conclusion: This study found PRMP are common in German adolescent string instrumentalists. Rates of PRMS and PRMD did not vary between upper and lower strings. Non-music musculoskeletal soreness and decreased right hand span were associated with the experience of PRMP. Early identification of risk factors may help inform intervention strategies and help prevent ongoing problems in young instrumentalists.

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Title **Mechanisms of Functional instability as seen in symptomatic Generalized Joint Hypermobility.**

Author(s) *Lies Rombaut, Inge De Wandele*

Ghent University, Belgium

Mechanisms of Functional instability as seen in symptomatic Generalized Joint Hypermobility.

Generalised Joint Hypermobility (GJH) is likely to result from laxity of the connective tissue in the soft tissues within and across the joints, implying a range of clinical symptoms, with functional joint instability as the most important.

To gain better insight into the mechanisms of joint instability, four cross-sectional studies of a typical condition with symptomatic GJH, the Ehlers Danlos Syndrome, Hypermobile Type (EDS-HT), was set-up. The studies showed that both failure in the tensile properties of ligaments and joint capsules, in addition to lack of proprioceptive information, are responsible for the observed joint instability. In this light, interventions to improve proprioception and neuromuscular control, balance, muscle strength and endurance can be implemented in the treatment of such patients with functional instability, and likely other symptomatic hypermobility related problems, as seen e.g. within performing arts.

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Title **Psychological skills and health-promoting behaviours in musicians**

Author(s) *Liliana Araujo¹, David Wasley², Louise Atkins¹, Rosie Perkins¹, Aaron Williamon¹*

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www.musicalimpact.org*

Introduction: In order to excel in a competitive field, musicians are required to effectively manage and adapt to the physical and psychological demands of making music. Therefore, the complete musician needs to display an array of skills and behaviours that go beyond technical proficiency to include physical fitness, psychological and life skills, health promoting behaviours and high levels of wellbeing. However, research suggests that pain, performance related problems, ill-health and anxiety remain highly prevalent among musicians.

Methods and material: To fully explore the physical, psychological and environmental factors associated with musicians' health and wellbeing, a four-year project – Musical Impact - was launched by Conservatoires UK in 2013. Now in its second year, the project is generating new knowledge of the physical and mental demands of music making, contributing insight into chronic and acute health problems and their impact over time, and examining effective strategies for promoting health. This paper focuses on one study within

Musical Impact – Fit to Perform - that examines musicians' levels of mental and physical fitness. In particular, this presentation will analyse musicians' lifestyle and health-promoting behaviours, sleep quality, psychological wellbeing, perceived fatigue and health, perfectionism, and coping skills.

200 musicians, drawn from nine UK conservatoires and one national orchestra, participated in the study. At the time of writing, data collection is complete and the dataset is under analysis.

Results: Preliminary results show positive indicators of wellbeing; musicians' level of perceived wellbeing is high and similar to the general population; their level of perceived fatigue is low when compared with previous studies. However, when comparing lifestyle behaviours with existing norms and previous studies, musicians' scores are significantly lower in sleep quality as well as health-promoting behaviours such as physical activity, health responsibility and stress-management. Results also reveal high levels of perfectionism and significantly less use of coping skills when compared with previous studies.

Discussion: The presentation will conclude with a discussion of identified needs in musicians' psychological skills and healthy behaviours, and will identify potential interventions for further investigation.

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Title	Rock around the clock? An investigation of health promoting behaviour, pre-performance habits and personality traits in rock musicians
Author(s)	Lisa Aufegger ¹ , Theerasak Chanwimalueang ² , David Wasley ³ , Danilo P. Mandic ² , Aaron Williamon ¹
	¹ Centre for Performance Science, Royal College of Music, UK ² Electrical and Electronic Engineering Department, Imperial College London, UK ³ Cardiff School of Sport, Cardiff Metropolitan University, UK
	<p>Aims: Classical musicians have received considerable attention, providing meaningful insight into psychological characteristics due to their instrument (Papageorgi et al., 2011; Benedek et al., 2014; Marchant-Haycox & Wilson, 1992), expertise (Brodsky, 2006; Kenny et al., 2014) or performance setting (Brotons, 1994; Craske & Craik, 1984). On the other hand, little evidence in alternative genres, such as rock music, exists. The aim of this study was two-fold: 1) to investigate health promoting behaviour and pre-performance habits of rock musicians and to establish their relation to personality traits; 2) to compare musicians' state anxiety, heart rate variability and breathing between a low- and a high-stress performance condition.</p> <p>Methods: Fifteen amateur rock musicians completed the Mini-IPIP (Cooper et al., 2010), the health promoting lifestyle profile II (HPLPII; Walker et al., 1987) and the Musicians' Pre-performance Survey (MPPS; Steptoe et al., 1995), while a sub sample of four band members' heart rate variability (HRV) and breathing was monitored during a baseline measure, a two-minute pre-performance period and a public performance. In addition, they were asked to fill out a state anxiety inventory (STAI-Y1; Spielberger et al., 1983) prior to both events. HRV and inter-breathing-intervals were analysed using the state-of-the-art stress measures derived in terms of low- and high-frequency distributions and average cyclic frequency, cyclic rate and cyclic period.</p> <p>Results and Discussion: Study 1) gives conclusive evidence that rock musicians lack in health promoting behaviour, such as physical activity, stress management and nutrition, yet are engaged in interpersonal experiences and spiritual growth. They are high in neuroticism and imagination/intellect, with the latter being associated with a decreased social pre-performance behaviour. Typical pre-performance habits are reading, exercising, and meditating. Study 2) reveals a significant deviation from the baseline -- decreased heart rate variability and increased respiration - during the performance period, and also during the transition from the pre-performance period to the performance period. By contrast, their state anxiety remained stable and exhibited only a weak correlation with physiological measures. Results are discussed and compared across different musical genres.</p>
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Poster

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Title Simulated musical performance spaces: The impact of virtual feedback on musicians' heart rate variability, breathing, state anxiety and self-efficacy

Author(s) Lisa Aufegger¹, David Wasley², and Aaron Williamon¹

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² Cardiff School of Sport, Cardiff Metropolitan University, UK

Aims: Simulated performance environments have been successfully applied as a training tool in disciplines such as sports, psychology, and medicine, offering a multimedia experience '... in which a person can move around and interact as if he actually were in this imaginary place' (Satava, 1993, p. 203). The investigation of the potential for application in the musical domain, however, remains relatively novel. The aim of this study was to further evaluate the simulated performance space designed by Williamon et al. (2014), which provides a space of salient cues from real-life performance situations as well as an interactive virtual audience and audition, respectively. Compared was the impact of positive versus negative virtual audition feedback on musicians' heart rate variability (HRV), respiration, state anxiety and self-efficacy.

Methods: Twelve musicians were asked to perform twice: (i) once in front of a positively behaving virtual audition panel; and (ii) once in front of a negatively behaving audition panel. In both conditions, HRV and breathing was monitored 5 minutes prior to and during the performance, while subjective reports of state anxiety and self-efficacy were collected before and after. HRV and inter-breathing-intervals were analysed using the state-of-the-art stress measures derived in terms of low- and high-frequency distributions and average cyclic frequency, cyclic rate and cyclic period.

Results: Results show a significantly decreased HRV and increased respiration during the performance period. While no difference between positive versus negative feedback on HRV was found, respiration was significantly elevated during the positive feedback condition. Musicians' subjective reports on state anxiety remained similar before and after both performance scenarios, yet their self-efficacy was significantly decreased after the negative feedback condition.

Discussion: This study demonstrates the impact of virtual feedback of different emotional valence on musicians' psychophysiological state before, during, but also after each performance condition. Implications of the results will be discussed for musical performance training, such the development of self-regulatory strategies.

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Title	Classification of musicians shoulder dysfunction in clinical practice
Author(s)	Mads Bruun Panduro, Physiotherapist
	Odense University Hospital, Clinic for performing arts medicine
	<p>Background: Musicians' playing requires repetitive movement patterns that can lead to upper extremity injury. The scapulo-humeral rhythm plays a vital role in injury-free playing. Scapulo-humeral dysfunctions have been associated with shoulder injuries in the overhead athlete.</p> <p>Objectives: The purpose of this case was to describe a screening and test procedure used on musicians with unilateral or bilateral shoulder pain caused by scapulo-humeral dysfunction.</p> <p>Methods: A sample of three musicians underwent a clinical screening and testing of the shoulder and neck. The musicians were afterwards classified based on Sahrmanns classification design of dysfunction of the shoulder. The treatment lasted for twelve weeks and consisted of mobilization, stretching exercises and dynamic stability training.</p> <p>Results: The musicians achieved increased active movement and control of the pain affected shoulder, with associated reduction of the shoulder pain.</p> <p>Discussion: There seem to be many uncertain factors in the classification based on posture and movement analysis, and selected tests for shoulder. However, this is an indispensable tool in the planning of the treatment strategies for the musicians' dysfunctions of the neuromuscular control of the scapula and humerus. However, it is important to emphasize that the training of dysfunctions cannot stand alone. It is still important that the pathology around the issue is dealt with.</p>

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Title	Stage fright and physical condition of wieniawski international violin competition participants
Author(s)	Wiktoria Pawelec, M.A. (1) Małgorzata Sierszeńska-Leraczyk, Ph.D., psychologist, musician (2)
	<p>1: Department of Biomechanics at University School of Physical Education in Poznan 2: Music Academy in Poznan, teacher in specialist music schools in Poznan, psychologist for more than 25 years.</p> <p>The first stage of research comprised participants (n=90) in subsequent Henryk Wieniawski Violin Competition (2001, 2005, 2011). Its results are presented at Musicians' Health & Performance 2nd Conference and include information on the nature of stage fright. Then, further aspects were studied, such as health and physiology, and a survey on health and psychological conditions was conducted among nearly 25 young outstanding violinists of various cultural, economic, educational and medical backgrounds. The survey inquired about the intensity of exercises, tiredness after work and breaks in the violin playing. Finally, they were examined with regards to musculoskeletal pain or disorders and asked if they used any treatment and did any active forms of recreation, sport and health spa in order to reduce tiredness and overstrain.</p> <p>Henryk Wieniawski International Violin Competition in Poznan is preceded by rigorous preliminaries, thus the very fact of participating in the competition is considered as an achievement. The competitors constitute a group of individuals whose high quality of music attainment is unquestionable and proved by previous achievements, such as prizes at various performance competitions, studying at prestigious music academies, and tuition with acknowledged violin teachers.</p>

Poster

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Title	"Eir-project – The development of a device for measuring muscle strength".
Author(s)	Mara Bianca Neneci (1), Thor Sørensen, (1), Anders Kjaersgaard (1), Timiciuc Andrei (1), Adriana Debowska (1), Rimvydas Jurkienas (1), Mette Maria Skjøth (1,2).
	<p>1: Lillebaelt Academy of professional Higher Education. 2: Odense University Hospital, Centre for Innovative Medical Technology.</p> <p>The project is a student project with students from areas of Computer science, IT Technology and Multimedia Design and has its origin from InnoEvent – a collaboration between Odense University Hospital, Lillebaelt Academy of professional Higher Education, University College Lillebaelt</p>

Aim: The objective of the “Eir-project” is to develop an innovative device for measuring muscle strength to prevent injuries, reduce pain and to support rehabilitation.

Methods: The “Eir-project” consists of the development of a device for measuring muscle strength. The development applies a participatory approach where the developers involve the users in the development process. The development process is based upon knowledge about hand injuries, technologies and rehabilitation. Interviews, field observation and a questionnaire are used to identify the needs of the users. The device in the Eir-project is similar to a dynamometer, but will be implemented with new technology and will provide the user with specific information about regarding muscle strength and risk for injuries. The product will be designed for the user to keep it in his hand and to squeeze it. The data information will be sent via Bluetooth to a mobile application, where the user can see all information and follow the results.

Results: The expected results are to develop a device based on inputs from the users and to prevent hand injuries, reduce pain and support rehabilitation. Data will be collected from each individual finger and saved in the “Eir” mobile app. Using “Eir” gives the opportunity to follow loss of strength in the hand or individual finger and for musicians this gives the opportunity to prevent injuries related to the use of instruments.

Conclusion: The development of “Eir” is in its early stage where interviews and field observations will be held together with the development of the prototype. To our knowledge the “Eir” is the first product of its kind combining a medical device and technology in an innovative way.

Title	The perception of the voice, health issues and work conditions among professional classical singers
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Author(s)	<i>Maria Sandgren</i>
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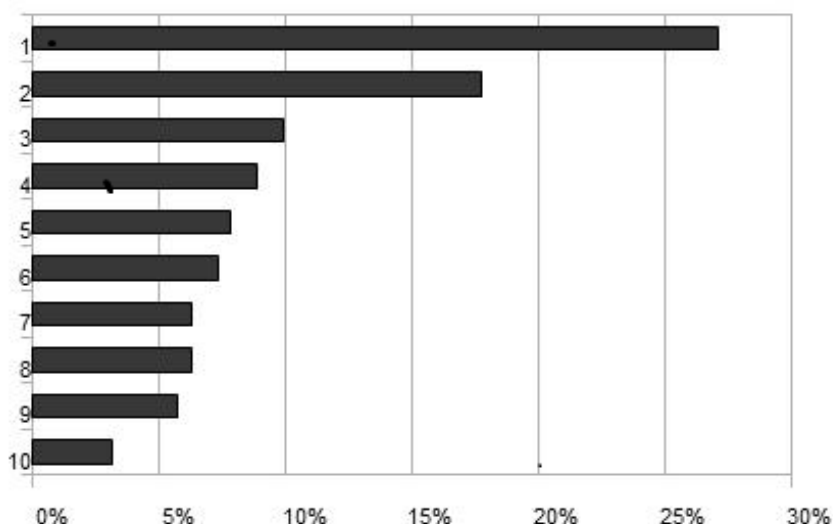
	<i>Södertörn University</i>
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Singers are a high risk group for developing vocal problems due to the extensive use of the voice (Williams, 2003). Chorus opera singers experience occupational role ambiguity and personal strain (Kenny et al., 2004) suggesting that occupational stress may contribute to quality of working life. Opera singers are preoccupied with voice quality and evaluation of their performance (Sandgren, 2002, 2009). Singers, compared to instrumentalists, include more of their personality in their musical concept (Sandgren, 2015).

The work conditions for singers can be characterized as boundaryless work (Allvin, 2008) meaning that they have to deal with irregular working hours, geographically dispersed work and short term employment. Singers work autonomously and are to a high degree personally responsible for the preparation of their singing and thus the result of their efforts. Another group of professional voice users (call center employees) share similar work conditions (Sprigg et al., 2003; d'Errico et al., 2010) such as constant monitoring of performance and high achievement goals.

The aim of the study was to examine if singers and call center employees (CCE) would differ on voice perception, health issues and work conditions. The participants (classical singers n=74, call center n=69) filled in a questionnaire with validated measurements on work attitudes, role stress, health and well-being.

Results showed that both singers and CCE reported vocal symptoms but of various kinds. Singers indicated slightly lower general psychological health but better physical health compared to CCE. Singers' psychological well-being was more closely linked to their perception of vocal quality than for CCE. Singers reported that they work more intensely, yet with higher job satisfaction compared to CCE. Based on previous and present research on singers, it is of importance to develop means and ways to support singers how to deal with the association between vocal performance and their psychological well-being.

Title Awareness of professionally ultimate skills in musicians**Author(s)** Marjatta Teirilä, *Dipl.oboist, PhD (1, 2)*
Räsänen Kimmo, *M.D., Ph.D. (2)*1: *Helsinki Conservatory of Music*2: *School of Medicine, Public Health and Clinical Nutrition, University of Eastern Finland, Kuopio Campus***Aims:** The aim of the study was to investigate musicians as healthcare clients. In consideration were their experiences whether they were pleased or frustrated about healthcare professionals' knowledge or ignorance of musicians' workability demands.**Methods:** The data was collected by an email questionnaire among conservatory teachers (in Helsinki and Turku, Finland) in order to gain snowball sample, wide enough to get saturated and for analyzing qualitatively.**Results:** The number of respondents was 189. Two out of three of them were classified frustrated according to their reported experiences. The data comprised 192 complaints and was itemized into ten categories (Figure1). There were three different occupational healthcare arrangements for musicians: A) the own occupational healthcare of their workplaces (opera and orchestras), B) an occupationally specialized healthcare organization (pedagogical institutes and the church), and C) public healthcare services (freelancers). The respondents had most confidence in workability judgements of the group A and less in the group C. The differences of frustrating experiences between the three groups were opposite but less prominent (Figure 2).**Figure 1.** Frustrated musicians' complaints (192) and percentage deviation of each item: ignorance (1), musculoskeletal (2), voice and breathing (3), sick leave (4), psychological load (5), physical load (6), airway pressure in winds (7), teeth and embouchure (8), hearing (9), and work vision problems (10).

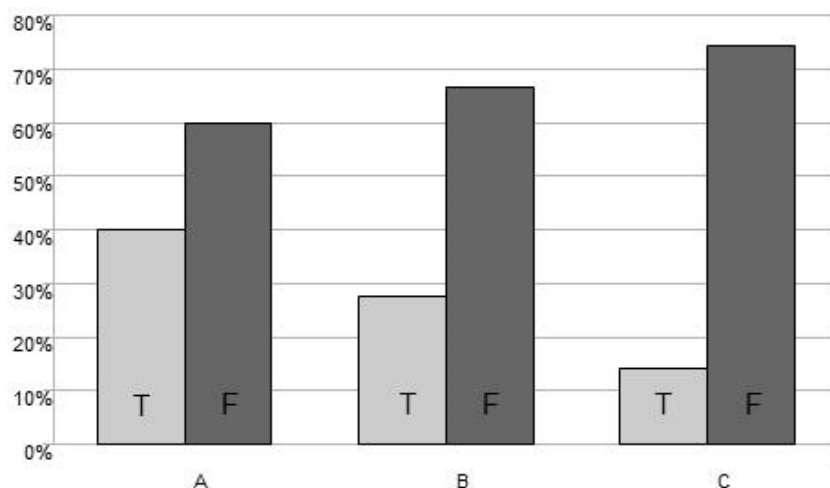


Figure 2. Percentage representation of trusting (T, n=47) and frustrated (F, n=111) clients in three different healthcare organisations (n=167). A: an own healthcare for performing artists (n=45), B: an occupational healthcare, not specific for musicians (n=87), and C public healthcare (n=35).

Conclusions: An own occupational healthcare of a workplace should be prioritized, especially when highly specialized professionals like musicians are concerned. Information on the details of workability demands of various instrumentalists and singers should be available for health care professionals. However, gathering adequate data requires more research among musicians in cooperation with them.

Title	Generalized joint Hypermobility in dance: a sign of talent or vulnerability
Author(s)	M.C. Scheper ^{1,2} , J.E. de Vries ^{1,2} , J. Verbunt ³ , F. Nollet ² , R.H.H. Engelbert ^{1,2}
	¹ Amsterdam School of Health Professions, Education of Physiotherapy, Amsterdam, ² Department of Rehabilitation, Academic Medical Centre, Amsterdam, ³ Department of Rehabilitation Medicine, Maastricht University Medical Center, Maastricht, The Netherlands
	Aim: To study the impact of generalized joint hypermobility (GJH) in professional dancers on physical fitness, musculoskeletal complaints and psychological distress.
	Methods: Thirty-six professional dancers were recruited and compared to age matched controls (mean age: 20.1, 17-27). Height, weight, Beighton score, physical fitness (walking distance, muscle strength, estimated V02max), musculoskeletal complaints (pain, fatigue) and psychological distress (anxiety, depression) were measured.
	Results: Univariate analysis revealed in between group analysis, that dancers (with and without GJH) had higher physical fitness (6 minutes walk test (MWT): $\Delta D = +8.4\%$, $p = .001$, V02max: $\Delta D = +12.8\%$, $p = .01$), more fatigue (CIS: $\Delta D = +80.3\%$, $p < .0001$) and greater psychological distress (HADS: $\Delta D = +115.0\%$, $p < .0001$). When comparing dancers and controls with GJH to those without GJH, lower levels of physical fitness (muscle strength: $\Delta D = -11.3\%$, $p < .0001$, 6MWT: $\Delta D = -9.9\%$, $p < .0001$), more fatigue (CIS: $\Delta D = +84.4\%$, $p < .0001$) and greater psychological distress (HADS: $\Delta D = +79.6\%$, $p < .0001$) were observed in subjects with GJH. Multivariate analysis showed that dancers have higher levels of physical fitness (6MWT: $p = .001$, V02 ^{max} : $p = .020$), however taking GJH into account, this advantage disappeared indicating lower levels of physical fitness in comparison to controls (6MWT: $p = .001$, Muscle strength: $p < .0001$, V02 ^{max} : $p = .040$). In regards to complaints dancers experienced more fatigue ($p = .001$) and psychological distress ($p < .0001$). This was associated with more fatigue ($p = .010$) and psychological distress ($p = .040$) when GJH was present.
	Conclusion: Dancers with GJH seem more vulnerable for musculoskeletal, psychological complaints and lower physical capabilities despite training. Although GJH enables dancers to perform complex dance routines it is also a riskfactor associated with pain, fatigue, deconditioning and anxiety. However it also may imply a that the presence of GJH can be seen as a risk for the development of chronic musculoskeletal complaints. Caregivers should monitor professional dancers closely, as their high-level physical performance also make them more susceptible for musculoskeletal pain as does the presence of GJH.

Title	Alexander Technique for Musicians
Author(s)	<i>Mary McGovern</i>
	<i>Teacher of the Alexander Technique, Violinist, Violin Teacher, Copenhagen, Denmark</i>
	<p><i>Workshop content:</i></p> <ul style="list-style-type: none"> -The essential principals of the Alexander Technique and how the Alexander Technique can be used to make one more aware of balance, posture and movement in the activities of daily life, as well as in specialised activities such as playing musical instruments, dancing and sports performance. - How the Alexander technique can have an immediate effect and how it supports building a long-term foundation for comfortable playing at your highest level. - Instruction on the practical application of the Alexander technique. <p>The Alexander Technique is a practical form of health education. It has a substantial history of helping musicians reduce injury and fatigue and improve technique, physical freedom, musical freedom, stamina and tonal quality. Teachers of the Alexander Technique are trained to observe the influence of the people's use of themselves upon function, especially on the functioning of the postural mechanisms and the mechanisms of respiration. By means of the skilled use of his hands and verbal instructions, the teacher helps the pupil to change inappropriate ways of using himself so that he lengthens in stature rather than shortens in stature, so that he widens rather than narrows, so that he frees up rather than being stiff. The teacher does this by conveying sensory experiences that physically demonstrate the meaning of the words he uses in teaching. In doing so the teacher helps the student get rid of unconscious, detrimental habits that compromise the organism's natural expanded, boyant state.</p>

Title	Twenty years of Musicians' Medicine in Finland
Author(s)	Miikka Peltomaa, MD, PhD
	<p>Otolaryngology, Head and Neck Surgery Special Competence in Musicians' Medicine Adjunct Professor, University of Helsinki</p>
	<p>Introduction: The musician has the same diseases and complaints as any patient visiting the doctor's office. The musician however has often health issues which are very special just for the musicians and for the instrument which the musicians plays. There is definitely a need for specialized health care services for the musicians.</p> <p>The organized activity in Musicians' Medicine started in Finland in the mid-1990s, when the first Savonlinna Arts Medicine Symposium was held at the Savonlinna Opera Festival. The symposium attracted some 60 musicians and health care professionals at once and created lots of attention in media and among professional music organizations.</p> <p>Results: The people active in Savonlinna Symposia founded the The Finnish Musicians' Medicine Association in May 2000. Today the Association has more than 300 members including medical doctors, physiotherapists, musicians and students interested in the health of the musician. The association organizes 2-3 educational meetings every year and creates a vivid network of professionals in Musicians' Medicine.</p> <p>The Finnish Medical Association (FMA) has run a complementary training programme since 1993, covering selected and often interdisciplinary branches of medicine. A training programme for special competence in Musicians' Medicine was approved in 2006, aiming to establish a network of Musicians' Medicine experts throughout the country. At the moment 20 doctors have received special competence in Musicians' Medicine.</p> <p>The Helsinki Music Center is home to Sibelius Academy (University of Arts) and two symphony orchestras, the Finnish Radio Symphony Orchestra and the Helsinki Philharmonic Orchestra since 2011. The Musicians' Clinic was started in early 2011 by a dozen of doctors and a physiotherapist to serve as a consultation clinic for the occupational health care of the organization above and the Finnish National Opera.</p>

Title	Patient cases from Clinic for Performing Arts Medicine: Musicians with severe symptoms of psychological distress
Author(s)	Nanna Mark, clinical psychologist
	Clinic for Performing Arts Medicine / Department of Occupational and Environmental Medicine, Odense University Hospital, Odense, Denmark
	<p>Introduction: Studies have indicated that there is among musicians compared to the general workforce a higher degree of depression and anxiety (Vaag et al., 2015), and a report on higher emotional demands, lower decision latitude, lower social support, lower sense of community and lower job satisfaction (Holst et al., 2012).</p> <p>Aims: The following aims to present the general results from an in depth description of experienced work-related problems among musicians showing severe symptoms of psychological distress. The description is based on 11 patient cases examined by the clinical psychologist of Clinic for Performing Arts Medicine in the period of January 2013 to March 2015, and categorised on different measures related to symptomatology and factors of psychosocial environment.</p> <p>Results: Among the patients there was generally a high degree of depression and anxiety symptoms, which is consistent with previous findings (Vaag et al., 2015), and for the most part anxiety symptoms were dominating. As for factors of psychosocial environment, some patients described disharmony related to either one colleague or a group of colleagues caused by unclear division of labour, unclear demands to the quality of rehearsal and performance as well as negative personal actions. There were some general work characteristics that applied for most patients: working as a professional musician was mostly characterised by high demands related to intensive performance, high degree of competition as well as high degree of being evaluated and judged. This is somewhat consistent with previous findings (Holst et al., 2012), primarily concerning low social support and low sense of community, making sense in combination with the general work characteristics of performance and competition.</p>
References	<p>1: Vaag, J., Bjørngaard, J.H., & Bjerkeset, O. (2015). Symptoms of anxiety and depression among Norwegian musicians compared to the general workforce. <i>Psychology of Music</i>, 1-15.</p> <p>2: Holst, G.J., Paarup, H.M., & Baelum, J. (2012). A cross-sectional study of psychosocial work environment and stress in the Danish symphony orchestras. <i>International Archives of Occupational and Environmental Health</i>, 85(6), 639-649.</p>

Title	Motor Performance, Physical Activity and Musculoskeletal Extremity Injuries in School-aged Children who participates in leisure time dance Sub-study of The Childhood Health Activity and Motor Performance School Study Denmark, The CHAMPS Study-DK
Author(s)	Professor Niels Wedderkopp
	The Sports Medicine Clinic, Hospital of Lillebaelt and Dep. Of Regional Health Research
	<p>The CHAMPS-Study DK is a longitudinal cohort study launched in 2008, following more than 1200 children from 10 public schools in the Municipality of Svendborg, Denmark.</p> <p>Data collection of musculoskeletal pain or complaints, sports participation and sports type during 2.5 school years was undertaken using Short Message Service (SMS-track). The SMS-track system makes it possible to gather information from respondents via text messaging.</p> <p>SMS-track: Every Sunday, the parents of the participating children received an SMS, asking "Has your child had any pain during the past week"? The possible answer options were one of four numbers, corresponding to pain or complaints located in</p> <ol style="list-style-type: none"> 1) the back 2) the arms 3) the legs or 4) no pain. <p>Children with a positive answer to 1), 2) and/or 3) were extracted from the database, and the parents were contacted via telephone by physiotherapists and chiropractors from the CHAMPS-Study DK to determine the need for a clinical examination.</p>

The children with a need for clinical examination were examined at their respective schools every week or fortnight by physiotherapists or chiropractors blinded to the status of GJH during the test rounds. The traumatic and overuse injuries were classified according to the ICD-10 by WHO. The severity, expressed by specific diagnosis, gives an understanding of the injury mechanism in terms of tissue damage. If needed, the child was referred for further para-clinical examination, such as X-ray, ultrasound or magnetic resonance imaging scan (MRI). To get a complete data collection on injuries, information of children being diagnosed elsewhere (e.g. hospital emergency department) during the study period was collected concurrently.

Sports activity: The weekly amount of organised sports activity, reported by the parents to each child as the number of times spent in organised sport activity, was also registered by the SMS survey every Sunday. The question was: "How many times did your child participate in organised leisure time sport within the last week?" with the possibility of answering the relevant number between 0 (none) and 8, with 8 corresponding to more than 7 times. The weekly amount was expressed in times, which is not equivalent to hours for all sports types. Therefore, the term 'sport participations' is used throughout the text.

Type of sport: If the answer to the amount of organised sports activity was a number between 1-8, it was followed by the question: "Which type of sport?" with 10 options for answering: 1: Soccer, 2: Handball, 3: Basketball, 4: Volleyball, 5: Rhythmic gymnastics, 6: Tumbling gymnastics, 7: Swimming, 8: Horseback riding, 9: Dancing and 10: Other sports.

Results: Children participating in dance during leisure time had better balance, they had better agility, but no difference in physical activity, aerobic fitness or jumping height was evident when compared to children not doing any leisure time sport.

Looking at the univariate incidences dance was one of the sports with most traumatic injuries, comparable to handball, soccer, basket ball and tumbling gymnastics, multivariately it was not significantly different from no sport but neither significantly different from soccer and handball.

Conclusion: Children using leisure time for dance training had better balance and agility, but had some injuries, but can not be determined as a "sport with high risk".

Title	Mindfulness-Based Stress Reduction program (MBSR) for musicians
Author(s)	<i>Ola Ellefsen, musician at the Royal Norwegian Air Force Band</i> <i>Jostein Kusslid, Major, psychologist, The Norwegian Armed Forces.</i> <i>Bård Greve, Major, psychologist, The Norwegian Armed Forces.</i>
	<p>Introduction: This study seeks to assess the effects of Attention Training (AT) in the format of a context-adapted group based Mindfulness-Based Stress Reduction program (MBSR), carried out on musicians in the Royal Norwegian Air Force Band.</p> <p>Various forms of mental training and focus on psychological factors are an integral part of a number of performance-oriented environments, like business, science, research and not least in sports. AT has since 25 years been used in these various performance-oriented environments. Varieties of MBSR and AT have also been tried in a military context. In the US, there is an extensive research on methods, and the subsequent testing has shown promising results. Also the Norwegian Armed Forces have tried out AT. The Norwegian Aeromedical Institute tested throughout 2010 this method on fighter pilots in the Air Force at the 331 Squadron, in close cooperation with the department of sports psychology at Olympiatoppen. The final report from this project is not clear, but the initial experience is entirely positive.</p> <p>Aim: With the aim to recommend awareness training for musicians, this study intends to conduct a randomized, controlled longitudinal experiment to see if there are measurable effects of mindfulness training for musicians.</p> <p>Methods and material: In March 2015 a project was initiated in the Air Force Band in Trondheim with the aim to see if AT could have any effect in relation to the stressors that may occur in a performance-oriented environment among musicians.</p> <p>Results: This MBSR is based upon Kabat-Zinn's 8-session course, a total of 26 hours. The course is not completed, but there will be a closer presentation of the different lessons and the musicians' reactions to the project so far.</p>

Discussion: Collecting information about subjective measures of physical and mental health will make it possible to investigate the immediate and long-term effects of mindfulness training on the musicians' ability to handle stress and performance anxiety related to the musician profession.

Keynote speaker

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Title	It don't mean a thing – or does it? What musical training does to the brain
Author(s)	<i>Peter Vuust, Aarhus, Denmark</i>
Developing musical expertise is an extremely demanding task which involves a lot of practice. This results in very specialized auditory and motor skills determining the way the human brain perceives and processes music. The present presentation focuses on differences in brain structure and function between musicians playing different styles of music such as jazz and rock music as compared to musically untrained people, with a specific emphasis on brain responses to unexpected musical events.	

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Title	Musculoskeletal pain, work posture and physical activity among professional symphony and opera musicians in Sweden
Author(s)	<i>Sara Johansson (1), Dag Rissén (2), Annacristine Fjellman-Wiklund (3), Helene M Paarup (4), Ulrik Röijezon (1)</i>
<p>1: Department of Health Science, Luleå University of Technology, Luleå, Sweden 2: Centre for Research & Development, Uppsala University/Region of Gävleborg, Gävle, Sweden 3: Department of Community Medicine and Rehabilitation, Physiotherapy, Umeå University, Umeå, Sweden 4: a) Research Unit of Occupational & Environmental Medicine, Clinical Institute, University of Southern Denmark. b) Department of Occupational Medicine, Hospital of South-west Jutland, Esbjerg.</p> <p>Aims: The objectives were to 1) investigate the point prevalence and the one year prevalence of musculoskeletal symptoms among professional classical orchestra musicians, 2) estimate the work posture regarding standing vs. sitting, and the physical activity among the musicians, and 3) investigate associations between pain and gender, work posture, and physical activity.</p> <p>Methods: The study is part of an ongoing national survey investigating the health situation among Swedish professional orchestra musicians. The data were collected from two orchestras. Seventy-eight musicians (80%) participated, aged 45 ±9.6 years with 41% women.</p> <p>Result: Ninety-one percent of the musicians reported pain during the last 12 months; 80% at more than one site. For both men and women the most frequently reported problem within the last year was neck pain (figure 1). While 96% of the musicians had a seated work posture all or most of the time in the orchestra, work posture was more diverse while practicing alone (figure 2). In total 73% (for females 67%; for males 77%) of the musicians fulfilled the Nordic recommendations for physical activity. Binominal logistic regressions including pain prevalence during last 12 months and gender, work posture, and physical activity were significant for hip pain ($p=0.020$) with gender (Odds ratio 4.9, $p=0.007$) as significant predictor, and knee pain ($p=0.035$) with work posture (Odds ratio 0.517, $p=0.046$) as significant predictor.</p> <p>Conclusion: In harmony with previous studies [1-2], the majority of the examined orchestra musicians experienced pain at some time point during a year. While almost all musicians play in a sitting position during orchestra rehearsals and concerts, playing posture varied more when practicing alone. Regression models including gender, work posture and physical activity revealed that 1) women were more prone to hip pain compared to men, 2) an association between knee pain and standing posture, while 3) no impact was found for physical activity in these preliminary results.</p>	

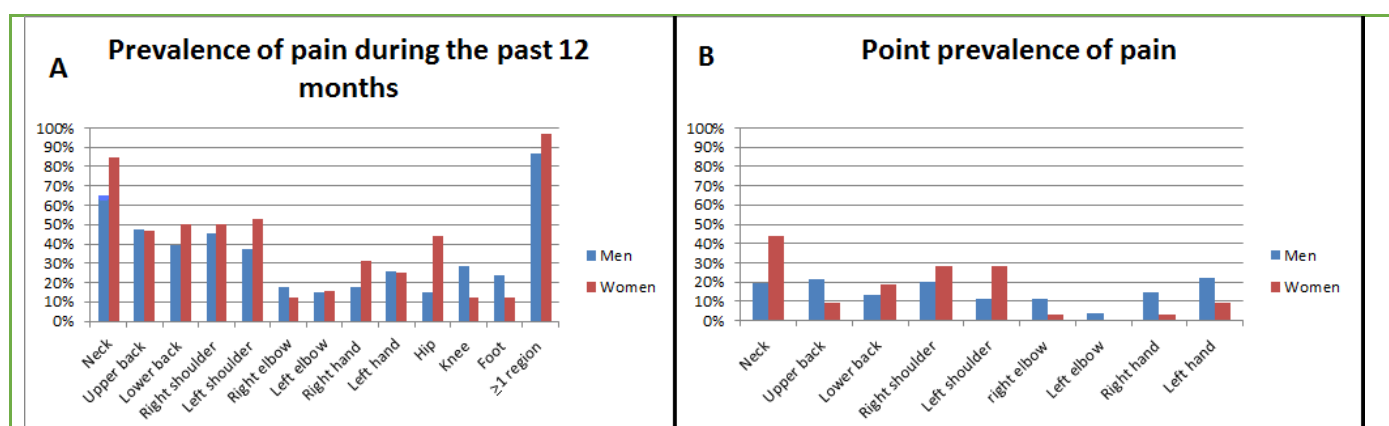


Figure 1. A) 12 months prevalence and B) point prevalence of musculoskeletal pain among professional musicians in two Swedish classical orchestras. Lower limb symptoms were measured only as the 12 months prevalence.

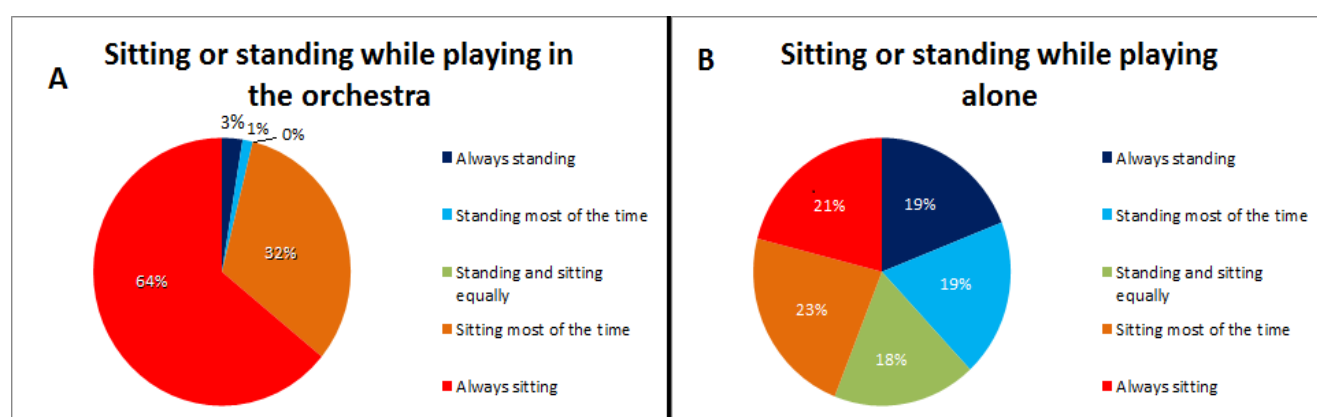


Figure 2. Amount of time positioned in a sitting or standing work posture. A) During orchestra rehearsals and concerts, B) during practicing alone.

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Title	What is the optimal coordination of the musician's body for expressing music freely?
Author(s)	<i>Tina Margareta Nilssen.</i>
	<i>Teacher of Timani (movement analysis and coordination re-training for musicians) at the National Opera Academy in Oslo, Norwegian University of Science and Technology – Institute of Music in Trondheim, University of Tromsø – Institute of Music, and Barratt Due Music Academy in Oslo amongst others.</i>
	<i>Founder of the Timani Academy, educating musicians specializing in movement health, injury prevention and physiological prerequisites for high performance.</i>
	As a musician the aim is to freely express music through an external instrument or the vocal chords. The movement towards sound production must first be initiated in the musicians' body, or nothing will happen at the instrumental level – no sound will be produced. For a musician to access his or her full musical potential, it is therefore vital that the body has a well-developed movement capacity and multiple choices to move. Movement restrictions, unconscious habitual movement patterns and movement disorders caused by repetitive strain injury or neurological pathology such as focal dystonia can represent major obstacles for the musicians' freedom to musically express. Why do physical impairments occur in the musicians' body? Through eight years of teaching approximately 1800 professional musicians and students in the subjects of music physiology, music psychology and music interpretation I have done many observations. I will present these observations from a teachers, therapist and musicians point of view and discuss questions such as: What are common misconceptions around optimal use of the body while playing? Why is natural instrumental and singing technique so hard to find? What can go wrong in this search and why? I will also discuss the common pedagogical tool of using metaphors to describe physical and musical

intention and the challenges these may present.

In the practical part of my presentation with simple audience participation I will teach simple tools for motor control re-training of the hands and trunk through specific movements and breathing. The audience might discover that through the re-training of muscles there will be a greater access to both proprioceptive sensory input and movement capability, and therefore more choices for the body to move freely. I will also discuss the importance of specific and relevant anatomical training for musicians.

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Title	Playing-related musculoskeletal disorders among classical piano students of tertiary institutions in Malaysia
Author(s)	<i>Titi Rahmawati Hamedon¹, Ling Chia Ying², Loo Fung Chiat³</i>
	¹ <i>Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia</i> ^{2,3} <i>Faculty of Human Ecology, Universiti Putra Malaysia, Malaysia</i>
	<p>Background: Pianists often suffer from playing-related musculoskeletal disorders (PRMD), due to the long hours of static playing posture, playing techniques, and their working conditions. It has been reported that musician have about 30 to 90% risks of getting injury in the shoulder and arm regions and within the spine. PRMD among pianist had been extensively studied overseas, but it had not been given adequate attention in Malaysia.</p> <p>Aim: The general objective of this study was to determine the extent of PRMD among classical piano students in tertiary institutions in Kuala Lumpur and Selangor, Malaysia. The level of their knowledge and possible risk factors of PRMD were also studied.</p> <p>Methods: Data was collected from respondents, using questionnaires, in a face to face interview. A number of 192 respondents completed the questionnaire.</p> <p>Results: A total of 68 students (35.4%) were found to have PRMD. The most common parts affected were the shoulders, followed by in the arms, fingers and wrists. The most common complaints of those who have PRMD were pain and stiffness of the joints, and fatigue. As for the knowledge on PRMD, only 112 students (58.3%) had heard at least one of the general terms that describe pianist's injuries. Most respondents (71.4%) could not give specific examples of PRMD's signs and symptoms. There were statistically significant association between PRMD and longer piano practice hour ($p=0.031$), the habit of not taking a break in the middle piano practice ($p=0.045$), not doing physical cool down exercises ($p=0.037$), and not taking special dietary supplements ($p=0.007$).</p> <p>Discussion and conclusions: Classical piano students should be educated on the signs and symptoms of PRMD and its ways of prevention, since PRMD can affect them too. They should also be encouraged to take a break in between piano practice and do cool down exercise before they stop practicing.</p>

Main workshop

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Title	Psychology & Performance -How to make a confident audition
Presenter	<i>Ulla Munch, Singer, Coach, Owner of Ulla Munch - Performance</i>
	<p>Manage performance anxiety with Structured mental training.</p> <p>Stay focused during performances, concerts and auditions using visualization, tensioncheck, powerposes and storytelling.</p> <p>Based on the techniques of Robert Nideffer, sports psychologist, and adjusted to fulfill the complex needs of the musician.</p>

Title	Generalised Joint Hypermobility and musculoskeletal pain among professional classical orchestra musicians in Sweden – a pilot study								
Author(s)	Ulrik Röijezon (1), Dag Ardel (2), Dag Rissén (3, 4), Annacristine Fjellman-Wiklund (2), Birgit Juul-Kristensen (5).								
	1: Dep. of Health Science, Luleå University of Technology, Luleå, Sweden 2: Dep. of Community Medicine & Rehabilitation, Physiotherapy, Umeå University, Umeå, Sweden 3: Centre for Research & Development, Uppsala University/Region of Gävleborg, Gävle, Sweden 4: Centre for Musculoskeletal Research, Department of Occupational and Public Health Sciences, Faculty of Health and Occupational Studies, University of Gävle, Gävle, Sweden 5: Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense, Denmark								
	Aims: The aims were to 1) investigate the presence of Generalised Joint Hypermobility (GJH) and musculoskeletal pain among musicians in professional Swedish symphony and opera orchestras, and 2) investigate associations between GJH and musculoskeletal pain. Methods: A Swedish version of the 5-part questionnaire [1] and the standardised Nordic questionnaire for musculoskeletal pain disorders [2] were included in an ongoing national survey on musculoskeletal health conditions among professional orchestra musicians in Sweden. The data of this report is collected from two orchestras. Seventy-eight musicians (80%) participated, aged 45 ±9.6 years with 41% women. Results: At present, 77 participants completed the 5-part questionnaire, of which 19.5% (28% of the women and 13% of the men) scored two or more on the 5-part questionnaire, which is the criteria for GJH. Pain prevalence during the last 12 months was highest for the neck (73.7%) and lowest for the left and right elbows (15.6% and 16.9%, respectively) (Table 1). Binary logistic regressions revealed that hypermobility was associated with increased risk for pain conditions at the neck (Odds Ratio 5.64, p=0.005) and the left and the right hand (Odds Ratio 1.80, p=0.019 and Odds Ratio 1.68, p=0.032, respectively) (Table 1). Discussion/Conclusion: Previous studies have reported various results regarding hypermobility and association with musculoskeletal pain conditions, including both increased and reduced risk [3-5]. Our study shows increased risk of pain located to the neck and both hands among musicians with GJH, while no significant increased or decreased risks were seen for the other body parts. However, larger groups of musicians should confirm the influence of GJH on musculoskeletal pain, and whether it differs between men and women and between groups of instruments. The current preliminary results may indicate that GJH among musicians should be identified and preventive strategies be recommended, e.g., regarding pauses, posture and physical exercises.								
	Table 1. Pain prevalence and binary logistic regression analyses of the association between GJH and musculoskeletal pain during the latest 12 months.								
	<i>Pain</i>		<i>Binary logistic regression</i>						
	<i>12 months prevalence</i>	<i>n</i>	<i>B</i>	<i>S:E</i>	<i>Wald</i>	<i>P</i>	<i>Odds Ratio</i>	<i>95% CI for Odds Ratio</i>	
Neck	73.7%	75	1.73	0.62	7.71	0.01	5.64	1.66	19.15
<i>Upper back</i>	48.1%	76	0.20	0.22	0.81	0.37	1.22	0.79	1.90
<i>Lower back</i>	44.2%	76	0.28	0.23	1.56	0.21	1.33	0.85	2.07
<i>Right shoulder</i>	47.4%	77	0.39	0.24	2.72	0.10	1.48	0.93	2.34
<i>Left shoulder</i>	44.2%	76	0.28	0.23	1.56	0.21	1.33	0.85	2.07
<i>Right elbow</i>	16.9%	76	0.28	0.27	1.06	0.30	1.32	0.78	2.23
<i>Left elbow</i>	15.6%	76	0.12	0.29	0.17	0.68	1.13	0.64	1.98
Right hand	23.4%	76	0.59	0.25	5.46	0.02	1.80	1.10	2.94
Left hand	26%	76	0.52	0.24	4.57	0.03	1.68	1.04	2.72
<i>Hip</i>	27.6%	75	-0.01	0.25	0.00	0.98	1.00	0.61	1.62
<i>Knee</i>	22.1%	76	0.09	0.26	0.13	0.72	1.10	0.66	1.81
<i>Foot</i>	19.7%	75	-0.79	0.45	3.18	0.08	0.45	0.19	1.08

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Title	Prevalence of Musculoskeletal Pain and Generalised Joint Hypermobility among Jazz Musicians in Swedish Big Bands
Author(s)	<i>Gustaf Thordin (1), Adam Fransson (1), <u>Ulrik Røijezon</u> (1).</i> <i>Presenting author: Ulrik Røijezon</i>
	<i>1: Department of Health Science, Luleå University of Technology, Luleå, Sweden</i>
	<p>Aims: The aim of this study was to investigate the prevalence of musculoskeletal pain and generalised joint hypermobility (GJH) among professional jazz musicians in Swedish big bands and to investigate possible associations between GJH and pain.</p> <p>Methods: An existing health questionnaire developed for professional orchestra musicians, including the 5-part questionnaire for GJH [1], the standardised Nordic questionnaire for musculoskeletal pain disorders [2] and additional specific questions about playing related musculoskeletal pain (PRMD), was presented to jazz musicians employed at three professional Swedish big bands. Thirty musicians (86%) participated, aged 45 (± 10) years, only two (7%) of the participants were women.</p> <p>Results: The total prevalence of musculoskeletal pain within the previous 12 months was 91%, while total point prevalence was 47%. The neck, lower back and left shoulder were the most common regions for both 12 month and point prevalence among the musicians.</p> <p>The total prevalence of PRMD, defined as pain or related symptoms that interferes with ability to play, within the last 7 days was 27%. Most common regions were the neck and left shoulder, followed by low back and left hand.</p> <p>Twenty-seven percent reported GJH, and binary logistic regression analyses showed significant association between GJH and left hand pain within the last 12 months ($p=0.04$).</p> <p>Discussion/Conclusion: Remarkably few research studies have investigated pain prevalence among jazz musicians. This study displays, in accordance with previous studies on professional classical orchestra musicians [3,4], that the prevalence of musculoskeletal pain is high among jazz musicians. Significant association was seen between GJH and left hand pain. Although 86% of the jazz musicians employed at Swedish big bands participated in the study, the sample is still relatively small. More research on the health situation among jazz musicians is warranted, including freelance musicians who constitute a large group of the professional jazz musicians.</p>
References	1: Hakim, A. J., and R. Grahame. A simple questionnaire to detect hypermobility: an adjunct to the assessment of patients with diffuse musculoskeletal pain. <i>International journal of clinical practice</i> . 2003; 57(3): 163-166. 2: Kuorinka, Ilkka, et al. Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms. <i>Applied ergonomics</i> . 1987; 18(3): 233-7. 3: Paarup HM, Baelum J, Holm JW, Manniche C, Wedderkopp N. Prevalence and consequences of musculoskeletal symptoms in symphony orchestra musicians vary by gender: a cross-sectional study. <i>Bmc Musculoskeletal Disorders</i> . 2011; 12: 223-234. 4: Leaver R, Harris EC, Palmer KT. Musculoskeletal pain in elite professional musicians from British symphony orchestras. <i>Occup Med (Lond)</i> . 2011;61:549-55.