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TOWARDS A MODEL FOR MUSICIANS' OCCUPATIONAL HEALTH EDUCATION AT TERTIARY LEVEL IN SOUTH AFRICA

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ABSTRACT

The high statistics of musicians' performance-related pain and injury are well documented. Research shows that tertiary level musicians' occupational health education is imperative, and internationally more and more institutions are proactively incorporating innovative preventative educational programmes as part of their coursework. However, there are no courses in musicians' health offered in any of the music departments of South African universities. In this article we will explore a model towards musicians' occupational health education, based on the research done by Judy Palac, a specialist in performing arts medicine education. Her collaborative and interdependent model for a musicians' health intervention has three components: health professionals diagnose and treat musicians with music-related physical or psychological disorders; music teachers provide pedagogy that is founded on sound musical, psychological and biomechanical principles; movement and somatic specialists provide knowledge

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of the body in music making. Our aim is to demonstrate how this framework is applicable in South Africa. Brief recommendations for possible implementation strategies in the South African context are made.

Keywords: musicians' occupational health, music education, music performance, health promotion, injury prevention, Body Mapping, Alexander Technique, Feldenkrais, somatic education, performance-related musculoskeletal disorders

INTRODUCTION

The high statistics of musicians' performance-related pain and injury are well documented and research shows that tertiary level musicians' occupational health education is imperative, yet there are no university courses in musicians' health offered in South Africa. In this article we will discuss the background of occupation-related health problems specific to musicians, after which we will elaborate on existing preventative health programmes offered at international music schools. Against this background we will propose a model for South African tertiary level musicians' occupational health education. This will be based on the work done by Judy Palac, an associate professor of music education and Chair of the Musicians' Wellness Team at Michigan State University (MSU). She runs the course 'Healthy Musicianship' at MSU, is a specialist in performing arts medicine and string education and has published extensively in both fields.

BACKGROUND

According to Harman (2010) and Dommerholt (2009), occupation-related medical problems among musicians have been extensively researched and documented since the 1980s with the development of the interdisciplinary field of Performing Arts Medicine. Professional organisations such as the Deutsche Gesellschaft für Musikphysiologie und Musikermedizin (DGfMM) in Germany, the Performing Arts Medicine Association (PAMA) in the United States of America, and the British Association for Performing Arts Medicine (BAPAM) in the United Kingdom, exist in many developed countries. Goals of these organisations include prevention (for example identification of risk factors and education programmes), treatment, health promotion, professional training, research, publications, interdisciplinary collaboration, conferences and international relations (Winspur, Arcier, Blum and Brandfonbrener 2003).

From the existing body of literature on the subject of music-related medical problems, it is clear that musicians are at a high risk of experiencing physical and psychological strain and injury that are directly related to their music-making (Leaver, Harris and Palmer 2011; Hoppmann 2010; Dommerholt 2009; Kenny and

Ackermann 2009; Lederman 2003; Roset-Llobet, Rosinés-Cubells and Saló-Orfila 2000; Zaza, Charles and Muszynski 1998; Bejjani, Kaye and Benham 1996; Ostwald, Byl, Baron and Wilson 1994; Quarrier 1993; Lockwood 1989). In 1988 Fishbein, Middlestadt, and Ottati, undertook a large-scale study of professional musicians, regarding musculoskeletal and non-musculoskeletal problems. Musicians of forty-eight orchestras in the United States were surveyed. The results revealed that 76% of the musicians had at least one performance-related medical problem, and 36% reported four. The non-musculoskeletal problems included stage fright, hearing-related problems, eye strain, sleep disturbance and drug use (such as beta-blockers), with stage fright being the most frequently mentioned (Fishbein et al. 1988). Watson (2009) notes that noise-induced hearing loss and music performance anxiety (MPA) are also both well-documented conditions among musicians falling into this category.

Yet musicians' psychological and physiological issues cannot be viewed as separate from one another. Watson (2009, 340–342) discusses how psychological and physical strategies are mutually supportive in managing performance-related psychological stress, including breath control, muscle relaxation techniques, cognitive-behavioural therapy and somatic education approaches. Ackermann (2010, 248) explains that physical and psychological stressors act synergistically to produce a negative effect on injury and performance. Psychological factors, such as performance stress and anxiety, have been shown to cause increased muscular tension and are linked to musculoskeletal disorders (Rickert, Barrett and Ackermann 2013; Guptill 2011; Zander et al. 2010). Conversely, yet similarly, musicians' physical symptoms also cause psychological stress and emotional suffering (Siebrits 2005; Spahn, Ell and Seidenglanz 2001). The study by Zaza, Charles and Muszynski (1998, 2020) found that: 'Performance-related musculoskeletal disorders are personal, chronic and disabling health problems that affect the whole person, physically, emotionally, occupationally, and socially.' A conclusive finding in a recent paper by Kenny and Ackermann (2013) showed that the severity of musculoskeletal problems was directly linked to severity of performance anxiety. This research has implications for the direction of future prevention and treatment of musicians' occupational medical problems, and may indicate a need for more holistic somatic interventions, which will be discussed later.

It is imperative, however, to take cognisance of the fact that the majority of musicians' performance-related medical problems are musculoskeletal in origin (Lederman 2003; Roset-Llobet et al. 2000; Middlestadt and Fishbein 1989). Winspur (2003) warns against imprecise terminology and draws our attention to the need for a scientific approach in identifying the pathological basis of conditions among musicians which were often very broadly labelled as 'overuse'. The current standard operational term that is used is 'performance-related musculoskeletal disorder' (PRMD), and refers to 'any pain, weakness, numbness, tingling or other physical symptom that interferes with the musician's ability to play their instrument at the level to which

they are accustomed' (Ackermann, Driscoll and Kenny 2012, 182). It is important to note that musicians' PRMDs are neuromusculoskeletal disorders that originate from playing a musical instrument (Zaza 1998b). Examples of the types of musicians' PRMDs are: generalised pain and overuse syndromes, inflammatory conditions such as tendonitis, ganglion cysts, joint hypermobility, rotator cuff syndrome and bursitis, various dystonias, as well as nerve entrapment or compression disorders such as carpal tunnel and thoracic outlet syndromes (Dommerholt 2009; Watson 2009; Dawson 2008; Bragge, Bialocerkowski and McMeeken 2006; Lederman 2003). In singers, it includes laryngitis, Gastroesophageal Reflux Disorder, vocal misuse and vocal fold polyps, while in wind players, velopharyngeal insufficiency, embouchure dystonia and rupture of Orbicularis Oris can occur (Watson 2009).

PRMD is a serious issue and cannot be ignored. According to Zaza (1998a), the reported prevalence of PRMD in adult musicians ranges from 39% to 87%. Before that, Larsson (1993) found that 67% of the music students and staff surveyed at a music college reported PRMD, and up to 62% of high school musicians had been injured. More recent research supports earlier findings, indicating similar rates of PRMD for both tertiary students (Ajidahun and Phillips 2013; Lopez and Martinez 2013; Zander, Voltmer and Spahn 2010; Brandfonbrener 2009) and professionals (Fotiadis, Fotiadou, Kokaridas and Mylonas 2013; Ackermann et al. 2012).

The question now arises as to what can be done about the problem. In order to develop effective intervention and prevention strategies, risk factors must be identified (Devroop 2014; Manchester 2006). The numerous risk factors that play a role in the development of PRMD are complex and often specific to the type of instrument, the individual (for example, age and professional status) and the particular community of musicians (Roset-Llobet et al. 2000). Schaefer and Speier (2012), referring to musicians as 'instrumental athletes', identified risk factors including changes in the routine of practice and performance, amount and intensity of practising, technique, poor posture, unnecessary muscle tension, the instrument, confined spaces, poor equipment and inadequate lighting. Devroop (2014) added a few more such as performance environment, performance literature, the performer's physical attributes and the biomechanics of playing a particular instrument, while highly repetitive movements and maladaptive movement patterns are noted by Chan, Driscoll and Ackermann (2014). Bragge et al. (2006) suggest that investigation of risk factors for PRMDs should focus on specific instrumental groups due to the differing physical and instrumental requirements. Barton and Feinberg (2008, 47) describe the environmental, physical and psychological risk factors succinctly:

Musicians have the potential for health risk and injury because of the physical requirements for playing an instrument, the environmental factors that can affect making music, and the emotional stressors that are inherent within this occupation.

PREVENTION EDUCATION IN INTERNATIONAL TERTIARY INSTITUTIONS

Alice Brandfonbrener (2004, 1), a former professor of medicine, pioneer in Performing Arts Medicine, director of the Medical Programme for Performing Artists at the Rehabilitation Institute of Chicago, and founder of the journal *Medical Problems of Performing Artists*, writes:

Music schools in the past regarded their role as making available the best possible training for their students, so that these students could become skilled, competitive, and successful in their musical careers. However, music schools have come to recognize that their institutions have injured students in large numbers, leading these schools to confront the necessity of redefining their roles to include a responsibility for students' health.

This is only one of many statements advocating that proactive injury prevention and occupational health promotion should be part of musicians' training at tertiary level (Panebianco-Warrens, Fletcher and Kreutz 2014; Clark and Lisboa 2013; Guptill 2011; Barton and Feinberg 2008; Britsch 2005; Siebrits 2005; Zaza 1992; Fry 1986). Alongside the research on prevalence of musicians' performance-related medical problems and the research on risk factors and prevention interventions, studies have also been done to investigate music students' attitudes towards health promotion. Surveys of conservatories found that music students had low scores in health responsibility, physical activity and stress management (Panebianco-Warrens et al. 2014; Kreutz, Ginsborg and Williamon 2009). Considering the high levels of physical, environmental and psychological demands that music students face, these results further demonstrate the need for occupational health education.

One such initiative is the Health Promotion in Schools of Music (HPSM) project. The main goal of the conference in 2004 was to assist music schools with 'educating for musical health'. It was hosted by Kris Chesky at the Texas Centre for Music and Medicine and it brought together health professionals, musicians, music educators and music administrators (Palac 2015). According to Palac and Grimshaw (2006,880), the HPSM 'was pivotal in the advancement of wellness education for musicians and in the collaboration of the fields of music and medicine'. Four categories of musicians' health were identified: neuromusculoskeletal health, vocal health, hearing conservation and psychological health. The conference published guidelines for tertiary level music institutions, recommending prevention education and intervention as the primary approach (Chesky, Dawson and Manchester 2006). The four key HPSM conference recommendations for tertiary level music colleges were:

- Adopt a health promotion framework
- Develop and offer an undergraduate "occupational health" course for all music majors

- Educate students about hearing loss as part of ensemble-based instruction
- Assist students through active engagement with health care resources (Chesky et al. 2006, 143).

These recommendations were adopted by the National Association of Schools of Music (NASM) and significant policy in terms of musicians' health education has since emerged in the US. The NASM Handbook 2012–13 (NASM 2013, 67) states that students must be provided:

[i]nformation regarding the maintenance of hearing, vocal, and musculoskeletal health and injury prevention. Music program policies, protocols, and operations must reflect attention to maintenance of health and injury prevention.

In the last 15 years internationally, there has been an increase in preventative programmes, such as injury screening, awareness and educational workshops, and initiatives surrounding musicians' health and well-being (Clark and Lisboa 2013). Many international tertiary music institutions now offer musicians' occupational health courses that share some common content, yet also vary in terms of curriculum and lecturers (including music educators, occupational therapists, physiotherapists and doctors) (Manchester 2007a, 2007b; 2007c). Similar courses could be implemented in university music departments in South Africa. A few examples follow that illustrate how such programmes are structured abroad.

At the Hannover University of Music and Drama in Germany, the compulsory course, 'Music Physiology', as well as voluntary seminars, individual consultations and Feldenkrais classes, are all coordinated by their Institute for Music Physiology and Musicians' Medicine. Course content includes anatomy and physiology for musicians, sensorimotor learning, hearing conservation, performance anxiety and practice strategies. Individual consultations with specialists in music medicine are accessible to all students and staff free of charge (Manchester 2007c). The Royal College of Music in London has a compulsory course consisting of two modules, namely an Alexander Technique class giving insights into somatic awareness, and a class called 'Healthy Body, Healthy Mind, Healthy Music', which teaches essential physical and psychological principles for musicians, including vocal health, hearing issues, physical aspects, fitness, nutrition and performance psychology. The course is taught by a multidisciplinary team of experts (Manchester 2007c). The John J. Cali School of Music at Montclair State University in New Jersey runs a performance health course which has Body Mapping as its core somatic education component and is compulsory for undergraduate vocal music education majors (Buchanan 2011). The health and wellness programme, called 'The Complete Musician', at the San Francisco Conservatory of Music offers various elective health-related courses, including two Alexander Technique (AT) classes every semester, and on site individual AT lessons. Medical specialists, physical therapists and other wellness practitioners lecture students on musicians' health topics, and students receive an

extensive health and wellness guide with resources, contacts and information (Health and Wellness Programs 2015).

At Michigan State University (MSU), the 'Healthy Musicianship' elective course, available to both undergraduate and postgraduate students, covers the four target areas outlined by the HPSM Conference, and teaches healthy musical and lifestyle habits through somatic approaches such as Body Mapping and the Alexander Technique. Specialists from the MSU Musicians' Wellness Team teach content in the four areas. (Manchester 2007b). Several other universities offer courses with similar curricula, such as 'Performance Preparation' at Ohio University School of Music (Manchester 2007a), 'Occupational Health: Lessons from Music' at the Texas Centre for Music and Medicine at the University of North Texas (Manchester 2007a), 'Health Promotion and Prevention of Injury for Musicians' at the University of Indianapolis (Manchester 2007a), 'Keys to Healthy Music' at the Eastman School of Music at the University of Rochester (Manchester 2007a), and 'Wellness Practices for Musicians' at the Centre for Arts and Wellness at George Mason University in Fairfax, Virginia (Manchester 2007c). Overall, it can be seen from the various examples mentioned that core content is consistent despite varying curricula, and that very often experts from both the music and healthcare professions are involved.

Research attention has been directed towards this area of occupational health education for both undergraduate and graduate music students. Studies, the majority of which were quantitative, have found these courses beneficial, providing evidence supporting their implementation (Lopez and Martinez 2013; Lee, Carey, Dubey and Matz 2012; Buchanan 2011; Zander et al. 2010; Barton and Feinberg 2008; Spahn, Hildebrandt and Seidenglanz 2001). In the Lopez and Martinez study (2013), the students improved their body awareness by 91% and the frequency of their injuries decreased by 78%. Barton and Feinberg (2008) found that students improved in both knowledge and application of health promotion and injury prevention strategies, and that the success of their project was also due to positive support from the university and its staff, as well as the collaboration between the student, music teacher and musicians' health course instructor. Cooperation between all stakeholders in any musicians' health programme is paramount (Buchanan and Hays 2014; Ziegler and Johns 2012; Spaulding 1988).

For sustainability of these types of courses, cooperation must exist between organisations, wellness initiatives and music colleges. The Performing Arts Medicine Association (PAMA), with professional members from both the medical and performing arts arenas, has been responsible for promoting research and customised treatment, and fostering education and awareness (Palac 2008). PAMA has also collaborated with the Music Teachers National Association (MTNA) in terms of health presentations at MTNA conferences and ongoing interaction (Palac 2015). In Germany, the DGfMM fosters

interdisciplinary collaboration between all the diverse groups of professionals who participate in the education and professional development of musicians – teachers and professors of music, colleges and universities, occupational researchers, physicians, dentists, physiotherapists, musical instrument makers, Feldenkrais and Alexander teachers, and others. (Winspur et al. 2003,348)

In order to facilitate prevention, the DGfMM has connections with music universities in that many of their member doctors provide medical care in the music institutions, and others offer musicians treatment centres at their hospitals. In Hannover, the Institute of Music Physiology and Musicians' Medicine is integrated with the University of Music and Theatre, and much research is carried out there (Winspur et al. 2003). At the University of Indianapolis, the collaboration of the Occupational Therapy School and the Music Department facilitates their musicians' health programme (Manchester 2007a). The integrated initiative at the Centre for Arts and Wellness at George Mason University in Fairfax, Virginia, also runs master classes in health topics, free consultations, coaching, evaluations and medical referrals for students, education in Performing Arts medicine for health professionals, resources and practitioners' lists, and collaborates with other departments at the university (Centre for Arts and Wellness 2007). These examples all show that interdisciplinary collaboration is crucial.

A MODEL FOR SOUTH AFRICAN TERTIARY LEVEL MUSICIANS' OCCUPATIONAL HEALTH EDUCATION

In terms of preventative education, there are currently no musicians' occupational health courses available at tertiary institutions in South Africa (Panebianco-Warrens et al. 2014), although the research on PRMD prevalence in South African musicians indicates statistics comparable with international studies (Ajidahun and Phillips 2013; Barnes, Attwood, Blom, Jankielsohn, Janse van Rensburg, Smith, Van Ede and Nel 2011; Hohls 2010; Van der Walt 2006). The small amount of existing research in the area of musicians' occupational health in South Africa has focused on classical musicians. Studies abroad, however, have shown that musicians of diverse genres experience physical and psychological problems related to their performance (Árnason, Árnason and Briem 2014; Heredia, Hinkamp, Brodsky and Llapur 2014; Mishra, De, Gangopadhyay and Chandra 2013; Erickson 2012; Kim, Kim, Min, Cho and Choi 2012; Hernandez, Russo and Schneider 2009; Barr, Potter, Van Dusen and Burke 2005; Kahari, Eklof, Sandsjo, Zachau and Moller 2003; Marques, Rosset-Llobet, Marques, Gurgel and Augusto 2003; Raeburn, Hipple, Delaney and Chesky 2003; Rigg, Marrinan and Thomas 2003; Chesky and Henoach 2000).

Devroop (2014) points out that in South Africa there is a general lack of awareness and knowledge of the medical problems of performing artists, including musicians' occupational health. There are no specialised clinical settings for

performing artists to receive treatment and there is a real need for research on South African musicians (*ibid.*). In order to increase public awareness, foster education initiatives for performing artists, increase knowledge among medical practitioners, develop interdisciplinary collaboration and increase research, Devroop has outlined a research model for Performing Arts Medicine in South Africa. He proposes that the model should include:

- The establishment of interdisciplinary research teams
- The identification of prevalence rates of medical problems among musicians from all genres to generate baseline data
- The determination and investigation of risk factors in order to develop preventative strategies
- Education, including the development of mandatory university coursework.

‘Education is critically important to both performing artists and teachers. ... If the cycle of performance-related medical problems is to be broken, then education becomes imperative’ (Devroop 2014, 53). As mentioned earlier, our exploration of a proposed framework for South African university level musicians’ occupational health education answers Devroop’s call for musician’s health education at tertiary level and is based on a model suggested by Palac (2008, 20). She suggests the following collaborative and interdependent model for a musician’s occupational health programme (Palac 2008, 20):

- Health professionals diagnose and treat musicians with music-related physical or psychological disorders
- Music teachers provide pedagogy that is founded on sound musical, psychological, and biomechanical principles
- Movement and somatic specialists provide knowledge of the body in music making

Applying this to music departments and schools of music in the South African tertiary education context, the following is suggested:

Diagnosis and treatment by health professionals

Palac (2015) notes that most medical professionals only see musicians after they are injured, making prevention intervention difficult, and that many music schools do not have health professionals on site. Students sometimes struggle to find a doctor, physiotherapist, or other medical specialist who understands musicians’ issues. She suggests a local multidisciplinary team approach, with ‘a variety of health practitioners, musicians, music teachers and somatic educators’ (2015, 29). The ethos should be one of collaboration, mutual respect and maintaining professional boundaries. The

Musicians' Wellness Team at Michigan State University is an example, comprising two doctors, two physiotherapists, a psychologist, an Alexander Technique teacher, two voice specialists and a Body Mapping teacher. Students book consultations and the MSU team has also established an extended community network of local doctors, counsellors and therapists (such as occupational therapy and massage), who are familiar with treating musicians. Students can be referred to the appropriate resources when necessary, which range from the services offered at the MSU student health centre to specialists at a musicians' clinic. In South Africa, Devroop (2014) points out that there is a need for training medical practitioners in Performing Arts Medicine, and for specialised clinical settings to serve the occupation-related medical needs of performing artists.

Part of tertiary coursework at our institutions should therefore include educating students about the appropriate professional medical resources and treatments available, and about the importance of accurate diagnosis. The musicians' health initiative at the university should include onsite health professionals, integrated with the programme and available for student consultations and referrals. This could involve collaboration with other departments within the university.

Music teaching based on sound musical, psychological and biomechanical principles

Music educators' musical knowledge and training are only one part of music teaching. Having knowledge in both psychological and biomechanical principles are the other two necessary aspects. Dawson (2006) agrees that tertiary level training particularly for music educators should include core curricula in musicians' health, so that music educators have the relevant knowledge about causes, risk factors, early recognition and, most importantly, prevention of injuries. Palac (2008) suggests that because music teachers have the most direct influence on music students, they should be given musicians' health information in the four core areas as recommended by the HPSM. In discussing the music educator's role, Palac (2008, 21) points out aspects such as 'health-promoting strategies in the classroom or rehearsal, the benefits of the establishment of body-friendly technique, and the necessary elements of a climate of health and wellness in the music room' as areas for training, research and collaboration. Nagel (2009) advocates the establishment of health programmes with inclusion of both the psychology and physiology of performance.

In South Africa, the four areas delineated by the HPSM Conference would serve as an outline for content included in tertiary musicians' health coursework, so that music educators would be trained in psychological and biomechanical principles. The biomechanical principles comprise the first three areas, neuromusculoskeletal health, vocal health and hearing conservation, while the fourth area, psychological health, covers the mental aspects such as performance anxiety and stress.

Movement and somatic specialists

An important part of tertiary coursework in musicians' occupational health is teaching body and movement awareness for injury prevention as well as for optimal performance. In a paper on performing artists and somatic approaches, Schlinger (2006, 865) highlights the importance of movement for musicians:

In music, the performer's movement expressly elicits and affects the sound of the instrument. In some situations, the instrument becomes an extension of the body, for example, the bow of the violinist or the drumsticks of the drummer. With voice, the vocal instrument is within the confines of the body, and, therefore is affected by posture, movement, and breath.

Quarrier (1993, 90) states that musicians should be seen as athletes, in that strength, flexibility, coordination, endurance and agility are required: 'Coordinated physical movements, often performed at high rates of speed for prolonged periods of time, are required to play a musical instrument.' It is clear that the musician's movement creates the sound, yet most musicians do not see themselves as 'movers', and awareness of movement is rarely taught (Conable and Conable 1995; Johnson 2009). Music is mainly defined by the sound, and musicians focus more on the sound itself than on the quality of their movement that generates it (Johnson 2009; Mark 2012). The quality of musicians' movements determines not only the quality of musical sounds produced, but importantly also musicians' health in terms of aspects such as tension, efficiency, posture and the potential for injury (Mark 2003; Mark 2012; Nesmith 2001; Vining 2008). Buchanan and Hays (2014, 2) confirm this: 'Effective movement is paramount in music-making due to the highly refined and intensely repetitive nature of performance.' Training efficient movement is therefore essential for musicians (Ackermann 2010; Buchanan 2011). Zaza (1998b, 11) similarly maintains that 'it is very important to examine how the muscles are being used and to correct any inefficient or inappropriate muscle patterns'.

Various somatic approaches have been used by musicians, including the Alexander Technique (AT), the Feldenkrais Method and Body Mapping for Musicians (BMG). They play an important role in educating musicians in efficient sensorimotor integration and could be offered as part of a wellness programme for tertiary students, dependant on availability of somatic specialists. The teamwork approach at MSU facilitates this, in that the Wellness Team members give somatic education classes on rotation each semester in either Alexander Technique, Pilates or Body Mapping (Palac 2015). According to Schlinger (2006, 865), somatic approaches

offer the performing artist ways of perceiving and sensing their movement to deepen understanding, maximize function, and at the same time, improve ease and balance. The ultimate goal of all of these is to help the performing artist connect the artistic process with non-injurious integrity of movement.

Alexander Technique

The Alexander Technique (AT) is a psychophysical approach that develops and improves kinaesthetic awareness to address inefficient movement habits (Klein, Bayard and Wolf 2014). Mayers and Babits (1987, 54), referring to the misunderstandings about the AT, clarify: 'It is not a system of exercises, or a relaxation technique, or a method of vocal or instrumental training. Simply, it is a re-education of habitual movement patterns so the body is used efficiently.'

Lessons in the Alexander technique ... help people recognise, understand, and avoid poor habits affecting postural tone and neuromuscular coordination. Lessons involve continuous personalised assessment of the individual patterns of habitual musculoskeletal use when stationary and in movement; paying particular attention to release of unwanted head, neck, and spinal muscle tension, guided by verbal instruction and hand contact, allowing decompression of the spine; help and feedback from hand contact and verbal instruction to improve musculoskeletal use when stationary and in movement; and spending time between lessons practising and applying the technique. (Little, Lewith, Webley, Evans, Beattie, Middleton, Ballard, Oxford and Smith 2008, 1)

Frederick Matthias Alexander used the word 'self' to describe the entire mind-body complex as an integrated whole (Rosenthal 1987). The psychophysical aspect is important: 'It is the way we think (or fail to think) that results in our physical behaviour and affects the quality of our movement in music preparation and performance' (Rosenthal 1987, 54). The AT is particularly valuable for performing artists 'whose minds and bodies are their instruments' (Rosenthal 1987, 53). Musicians who have done AT report benefits such as pain-free playing, reduced tension, increased calm, better concentration, more confidence, and musical improvements in respect of tone, articulation, vibrato, intonation and facility (Rosenthal 1987). Conclusive findings from a large randomised trial in the UK showed that a series of AT lessons had long term benefits for patients with back pain (Little et al. 2008).

The Feldenkrais Method

Developed by Moshe Feldenkrais, the group-instructed classes in Feldenkrais are called 'Awareness Through Movement' (ATM), while 'Functional Integration' (FI) refers to the individual therapeutic sessions. Schlinger (2006) notes that Feldenkrais is suitable for performing artists for both prevention and treatment, and that benefits include increased flexibility, decreased pain, balance and postural integration. For musicians, injurious or inefficient movements are identified, awareness of movements is improved and adjustment of movements is enabled. The emphasis is on experimental, exploratory process-oriented learning at the individual's own pace. The Feldenkrais teacher guides the student in awareness, perceptions of increased range and ease, and the effect of a certain movement or sequence on other parts of the body (Schlinger 2006). There are no judgements in terms of

success or failure, and movement sequences are slow and gentle, done in a spirit of curiosity. The sensorimotor and proprioceptive retraining is particularly helpful for musicians because of the movement awareness aspect (Spire 1989). Klickstein (2009) recommends both Feldenkrais and the AT for musicians to reduce tension, promote movement awareness, and learn to sit, stand, breathe and play with ease, stating 'instead of being an unconscious victim of your postures, you'll be able to sit and stand in ways that support fluent music making' (Klickstein 2009, 257).

Body Mapping for musicians

Body Mapping (BMG)¹ for musicians is one of the more recent somatic education methods and the only one currently designed specifically for musicians (Buchanan and Hays 2014). It grew out of the work of a prominent AT teacher in the USA, Barbara Conable, and is being further developed by Andover Educators, the international organisation of licensed Body Mapping teachers (Conable 2003). BMG applies relevant structural anatomy to playing an instrument and singing, and aims to help prevent and treat injury and to improve performance (Barrett 2006; Likar 2005). In developing Body Mapping for musicians, Conable's vision was for music education to be placed on a secure somatic foundation (Conable 2003).

Body maps, which influence motor learning and planning, are neural maps of bodily structures and functions, and are dependent on one's sensorimotor experiences (Nichols 2004). In their discussion of sensorimotor maps forming a 'mental picture' or 'body schema' of the body's muscles, bones, joints and tendons, Blakeslee and Blakeslee (2007, 29) explain how proprioception 'updates your sense of where you are in space and how your body is configured' with the result that 'these maps guide your body movements and expectations about these movements'. Conable (2000, 5) found that an inaccurate or inadequate body map correlates with inefficient and injury-producing movement. Nichols (2004, 2) explains the significance of teaching musicians about movement anatomy:

In the case of a highly trained artist such as a musician, it is expected that the cortical areas become reorganized in a way that reflects the motor planning practices of that individual. ... If movement is based on an inaccurate knowledge or perception about the anatomy of the body, then pathologic changes can result. These practices can lead to alterations in cortical representation, which can then become reinforcing of the faulty motor practice.

These poor movement habits can be addressed with BMG. Likar (2005, 2) states that through BMG students learn to question their own often unconscious conceptions of how their own bodies are structured and how correcting these inaccurate maps improves facility, ease and efficiency of playing or singing. The development of

1 The abbreviation BMG is used for Body Mapping because the abbreviation BM is already in use for several other medical terms.

sensorimotor skills is also part of the BMG approach. Two essential aspects in this regard are the training of kinaesthetic sensitivity and inclusive awareness (Caplan 2009; Conable and Conable 1995; Conable 2000; Johnson 2009; Malde, Allen and Zeller 2009). Kinaesthesia is the sense of movement or movement perception (Galvao and Kemp 1999). Musicians' movements are extremely precise, refined and repetitive. It is therefore essential to train musicians' ability to utilise their kinaesthetic sense more effectively to improve performance and prevent injury (Conable 2003). Practising kinaesthetic sensitivity is only one aspect of body awareness. Refining the use of all the senses that musicians need is part of the BMG approach (Conable and Conable 1995). The tactile, auditory and visual senses are also cultivated in the context of whole body awareness. The integration of the senses leads to the development of the musician's ability to use 'Inclusive Awareness', which is an awareness of the whole body in relation to the surrounding environment. The ability to spread one's attention gently and smoothly throughout the whole body, acknowledging spatial awareness and shifting one's focus fluidly as necessary, enhances performance (Caplan 2009; Conable and Conable 1995; Malde et al. 2009; Pearson 2006). The result is that the muscular system is able to diffuse the workload in a flexible and coordinated way (Pearson 2006).

Woodard (2009, 170) discusses the importance of kinaesthesia and movement training in music education. She concludes: 'Because of the intricacies and complexities of performing music, musicians require accurate and specific information about their bodies and their movement', finding that 'training movement through the practice of Body Mapping enhances musical performance with fluidity and expressiveness'. Body awareness thus becomes part of musical expression. As the musician combines their musical intention with a clear movement intention, this further develops bodily connectedness, ease and expression. Barbara Conable (2000, 48) states: 'When musicians conceive the sound they want to make they must also, simultaneously, conceive the movement that makes it.' This is all possible in the context of inclusive awareness (Caplan 2009).

In the light of what has been said about musicians' posture and movement awareness and training being an integral part of health promotion, injury prevention, performance enhancement and improved musicianship, the necessity of 'movement and somatic specialists' as the third part of Palac's model is clear. In South Africa we have professionals in various movement and somatic methods, such as the Alexander Technique, Body Mapping, Feldenkrais, Pilates and Biokinetics, who could be part of the teaching and therapeutic team in a university musicians' health programme. Music teachers would therefore acquire skills during their training to be able to integrate healthy posture and movement awareness into their teaching of beginner and elementary pupils.

CONCLUSION

Due to the alarming prevalence of both musculoskeletal and non-musculoskeletal occupation-related medical disorders in student and professional musicians, education for tertiary music students in musicians' occupational health is paramount. As described in this article, there is a vast amount of literature internationally, documenting not only the research in the field of musicians' health, but also the strong recommendations for preventative interventions and education, and the benefits of interdisciplinary collaboration. Understanding these issues begins with the cultivation of a proper respect for the performing arts as a profession in South Africa, as well as maintaining and improving the quality of tertiary education in the field.

Although the economic considerations in a developing country do raise challenges in terms of the implementation of tertiary education in musicians' occupational health, several suggested recommendations for possible implementation strategies in South Africa can be made. Palac's model provides an adaptable and cost-effective framework that can build on the available professional resources at the particular university. Inter-departmental collaboration, for example with sports medicine centres, could facilitate the development of the programme, with shared staff, resources and facilities. The model allows for locally sourced healthcare and music professionals to work together as an interdependent team. Specialists in musicians' occupational health could also train existing staff at the university's music department to co-ordinate such a programme for their students. When considering the funding of such a programme, possibilities include funding from the private sector and healthcare industries where healthcare professionals could benefit from the exposure. New fields of interest and collaboration between the music industry and healthcare could also open up. Tuition fees may need to include the cost of the extra modules. Increasing awareness within university settings could promote research. These research findings could be disseminated to various relevant institutions for promoting collaboration as well as focusing attention on the importance of Performing Arts Medicine.

As Devroop (2014) notes, there is also a vital need to increase knowledge among medical practitioners, which could be aided through Palac's collaborative model. Our current South African healthcare system brings to mind crisis and limitations and its dual nature, with both private and public structures, is complex. However, the field of Performing Arts Medicine needs to be recognised, and awareness promoted in medical and/or occupational health training. A further recommendation would therefore be the establishment of an affiliation body of performing arts health professionals from both the medical and the performing arts fields, in order to facilitate research, training, collaboration and conferences.

There is an urgent need in South Africa to foster and develop the field of Performing Arts Medicine, specifically musicians' occupational health. The value and necessity of occupational health coursework as part of musicians' training cannot

be emphasised enough. The collaborative and interdependent model as suggested by Palac provides a flexible structure that can be effectively utilised in the South African tertiary context.

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