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Evaluation and Treatment of Musicians from a Holistic Perspective

Abstract

Throughout the past 3 decades, treatment of injured musicians in a health care setting has been reported; however, the quality of care from a musician's standpoint is poor. As musicians are speaking up more about their pain, the profession of occupational therapy has the capacity to make an impact on the way musicians are treated from a rehabilitative perspective. Musicians often do not trust medical practitioners who follow the traditional medical model because their symptoms and concerns are not addressed. Occupational therapists, especially those working in the realm of hand rehabilitation, are well equipped to treat injured musicians using our unique activity analysis skills and holistic frame of reference; the goal is to return them back to their prior levels of playing. To support the *Occupational Therapy Practice Framework: Domain and Process's* vision, this article discusses evaluation and treatment of the unique musician emphasizing the musician's point of view through an occupation-based, client-centered, and evidence-based practice.

Comments

The authors report that they have no conflicts of interest to disclose.

Keywords

hand, health, health behavior, occupational science, occupational therapy practice framework, patient-centered care, quality of life, work

Credentials Display

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Musicians are a distinctive group to evaluate and treat for various reasons. First, research shows that they do not fully trust in the medical model because health care practitioners often dismiss their need to play (Guptill, 2012; Wilson, Doherty, & McKeown, 2014). Indeed, throughout the past 3 decades, the prevalence of playing-related injuries in musicians has remained as high as 50% to 84% (Ackermann, Driscoll, & Kenny, 2012; Fry, 1986). The biomechanical risk factors of musicians are mainly associated with the upper extremities, with females displaying a higher prevalence of musculoskeletal complaints compared to males (Kaufman-Cohen & Ratzon, 2011; Kok, Huisstede, Voorn, Schoones, & Nelissen, 2016).

Second, musicians often accept their pain as normal and continue to play, even with debilitating pain. Music is not just an activity or an occupation to musicians; it is their *raison d'être*. Rarely do they have the luxury of taking sufficient breaks away from their instruments, and this contributes to the difficulty occupational therapists may experience while treating this population. In addition to the high physical and psychological demands of their musical careers, musicians' unique mindset for playing with pain perpetuates a trend of repetitive strain injury (Ackermann et al., 2012). Looking at the prevalence of pain with regard to instrument type, string players represent 68% of musicians with playing-related musculoskeletal disorders (PRMD), while wind players represent 32% (Kaufman-Cohen & Ratzon, 2011). As musicians become more skilled, their repertoires inevitably become more demanding (Chan & Ackermann, 2014). This combination of increased time and practice with the instrument often becomes a recipe for a PRMD.

Occupational science (OS) is defined as “the study of humans as occupational beings” (Clark et al., 1991, p. 301). OS factors (related to musicians) addressed in this manuscript include occupation under the physical, sociocultural, and symbolic-evaluative subsystems (Clark et al., 1991). The *Vision 2025* future of occupational therapy recognizes the effect occupational therapy may have with musicians and identifies “a program to help musicians avoid repetitive motion injury” as an emerging area of need (2018, p. 19). This article helps to expand on the *Vision 2025* proposal relating to musicians by defining current terminology, evaluation needs beyond the standard biomechanical approach, and treatment suggestions for playing specific instruments. Proper referrals to other musically oriented organizations are also shared.

Playing-Related Musculoskeletal Disorders

The term used in the current literature to describe a musician's performance related pain is known as PRMD: “playing-related musculoskeletal disorder”. This term encompasses an effort to understand injury from the musician's perspective and was first defined in the seminal article written by Zaza, Charles, and Muszynski (1998). Their definition of PRMDs helped to shift the diagnosis of PRMD from the objective medical model perspective to the subjective perspective of the musicians themselves. It also gave musicians the opportunity to define their injuries when physicians dismissed their need to play (Zaza, Charles, & Muszynski, 1998). Thus, PRMDs are defined as “pain, weakness, lack of control, numbness, tingling, or other symptoms that *interfere* with your ability to play your instrument at the level you are accustomed” (Zaza et al., 1998, p. 2016).

Though Zaza et al. (1998) coined the term PRMD in 1998, more recently, other authors have changed the original definition of this term, muddying the use of PRMD in the literature (Kok et al., 2016; Steinmetz, Scheffer, Esmer, Delank, & Peroz, 2015). Studies targeting pain prevalence have used the term PRMD when comparing both professional and amateur musicians (Kok et al., 2016; Silva, Lã, & Afreixo, 2015). One study used PRMD as an umbrella term, including musculoskeletal disorders, that

specifically refers to professional classical orchestral musicians (Steinmetz et al., 2015); another study used the same term to include amateur musicians, too (Silva et al., 2015). However, the question is, should amateur musicians be grouped under the same PRMD definition as professional musicians? One could argue that there is disparity in technique, time spent, and perceived pressure between amateur and professional musicians. There may even be a difference in the understanding of this population depending on what ensembles they play in, such as a classical orchestra or a rock band.

To clarify how PRMDs should be defined, we suggest that PRMD literature should include all individuals who identify themselves as musicians because most performance-related pain is caused by excessive tension, poor posture, and incorrect ergonomics between the players and their instruments (Warrington, 2003). We believe PRMDs may be experienced by all musicians regardless of instrument or ensemble group. Performance level should not have an effect because PRMDs may be experienced as a student, amateur, or professional.

Moving forward, defining PRMDs concisely is important because this helps provide a common vocabulary for discussion of a specific population (Zaza et al., 1998). Defining the term PRMD also allows musicians the opportunity to identify the performance symptoms they feel they can or cannot control. The ultimate goal is to help musicians feel that they are understood by their medical providers; this not only improves client-centered care but also encourages musicians to make sense of and participate in their own health (Stewart et al., 1995). Rather than advising musicians to stop playing their instruments, occupational therapists may, instead, assist this population in developing alternative strategies for return to prior levels of playing.

Occupational Therapy's Role in Treating Musicians

Musicians believe there is a lack of specialist knowledge regarding their unique needs and performance culture (Wilson et al., 2014). The fact that doctors often do not feel confident in treating musicians supports musicians' insecurities regarding the medical model (Molsberger & Molsberger, 2012). Medical doctors who may not understand how best to treat this population should refer their patients to informed occupational therapists, as the practice framework supports helping these musicians return to their prior levels of functioning. According to the *Occupational Therapy Practice Framework: Domain and Process* (OTPF) (AOTA, 2014), the role of occupational therapists is to help clients achieve "health, well-being, and participation in life through engagement in occupation" (p. S4). Informed occupational therapists, especially those working in the hand therapy domain, are critical players in the health care team when treating musicians with PRMDs.

In the OTPF, playing a musical instrument may fall under several categories of occupation ranging from work, play, leisure, social participation, and education. These occupational contexts are important to consider when treating musicians, as their identities and sense of competence may differ depending on the values they place in these varying circumstances. Throughout the different environments encountered by musicians (e.g., practice room, concert hall), occupational therapists may enable participation and success through facilitating change in client factors and skills (Amini et al., 2014). These changes may be achieved through adaptations and modifications to the instrument or environment, all while considering the client's values, goals, and desires (Amini et al., 2014). What sets occupational therapy apart as a distinct and valuable profession is the use of occupations as both the means and ends of intervention (Amini et al., 2014). When treating musicians, there is no better way to engage them than to use music as a component of their healing process.

When occupational therapists incorporate the instrument into treatment sessions, this functions as a return to our roots in occupation and allows us to tap into the biopsychosocial model through work, play, leisure, and even self-care (Clark, 2012). Mary Reilly astutely stated in her 1961 Eleanor Clark Slage Lecture that “Man, through the use of his hands, as they are energized by mind and will, can influence the state of his own health” (as cited in Clark, 2012, para 7). Musicians have described their instrument(s) as an extension of their bodies, and therapists must recognize this intertwined relationship during the healing process and use it to their advantage (Guptill, 2012). Using activity analysis, occupational therapists may, for example, consider not only the unique range of motion needed for early return to playing, but also the use of the instrument for graded home exercises (Warrington, 2003).

Evaluation and Treatment of Musicians

The following tools are recommended for the evaluation and treatment of musicians with upper extremity injuries. The first tool is the Disabilities of the Arm, Shoulder, and Hand (DASH) functional outcome measure, a 30-item questionnaire that assesses upper-extremity musculoskeletal conditions. The DASH is widely used to quantify disability of the upper extremity in both non-musicians as well as musicians (Baadjou, de Bie, Guptill, & Smeets, 2017; Kok et al., 2016). The DASH offers an optional, 4-question module specific to sports and/or performing arts that helps to quantify the musician’s perception of his or her injury in relation to performance (Beaton et al., 2001). Items from the DASH assessment alone may not be sensitive enough to show a musician’s true disability; however, research done on the optional sports/performing arts module shows good internal consistency, good discriminative validity, and moderate construct validity (Baadjou et al., 2017). This optional module is important to use because general assessments alone, such as the DASH, may not be sensitive enough to reveal true disability from a PRMD (Baadjou et al., 2017).

The second evaluation tool to consider is the Grading of Severity of Injury Scale, which defines pain from a musician’s point of view using a scale of 1 through 5 (Fry, 1986). Fry (1986) created this scale to improve objective measurements for the common diagnosis “overuse injury,” using survey results from three international symphony orchestras. In the severity of injury scale, a Grade 1 indicates consistent pain in one location when playing, with pain ceasing once the musician stops playing. In contrast, a Grade 5 indicates an inability to use the hand due to disabling total arm pain in multiple locations. Grade 5 pain also interferes with daily living routines (Fry, 1986). Although there have been no studies evaluating the validity or reliability of this scale, musicians may find it more meaningful to use this scale rather than the standard Wong-Baker Faces scale or visual analog scale because it quantifies pain specific to musical playing activity (Hawker, Mian, Kendzerska, & French, 2011; Wong, 1995). While occupational therapists typically evaluate pain, health care practitioners may not be aware that musicians are known for normalizing playing with pain (Ling, Loo, & Hamedon, 2016). In fact, one study reveals that a majority of tertiary music students in Malaysia believed pain must be experienced to improve piano performance (Ling et al., 2016). This shows a need for increased advocacy among occupational therapists specifically to help normalize playing without pain.

Two return-to-play schedules that use meaningful language for musicians are identified in the literature; however, the validity and reliability of each are unknown. Since musicians risk reinjury without guidance, occupational therapists may help by providing clear, timed playing schedules for a healthy return to the instrument(s). Occupational therapists may consider Warrington’s (2003) Gradual Return to Play Schedule for musicians who are recovering from surgery to improve muscular strength and endurance. For example, the therapist may direct a musician who is still casted from surgery to start

“shadow playing” (or visualize playing) for 5 min, twice a day. Once the cast is removed, the client may start with a simpler repertoire and incrementally increase playing time.

Norris’ (1996) return-to-play schedule is another tool to consider for return to prior levels of playing. This schedule is divided clearly into play and rest periods that gradually increase as healing time lines progress. While similar in concept to Warrington’s (2003) return-to-play schedule, Norris’ (1996) schedule may be more suitable for musicians who need concrete guidance on how long breaks should be and how long they should play before increasing playing time. Clients who use this schedule may play at the same intensity, otherwise known as “level,” for 3 to 7 days. At Level 1, they are advised to play only for 5 min, rest for 60 min, and then play another 5 min (Norris, 1996). Overall, the play periods do not last beyond 50 min, and the rest periods are 5 min or 10 min (Norris, 1996). As with any return-to-play schedule, these schedules should be customized to help foster a sense of autonomy and competence.

Because of the high percentage of PRMDs that occur in musicians, treatment may also include a biomechanical approach, including custom orthotics, modalities (e.g., heat, ultrasound), stretches, and strengthening postural and underactive muscles (Moran, 1992; Shafer-Crane, 2006). Some positive benefits of manual therapies, neural gliding, and ergonomic interventions have been found for treating clients with peripheral nerve injuries, such as carpal tunnel syndrome (Roll & Hardison, 2017). Tables 1 and 2 list specialized treatment suggestions to help occupational therapists better collaborate with musicians and address the musicians’ unique concerns.

Table 1
Instrument Modifications

Instrument	Issue	Modifications
Wind Instruments	1. Excessive static load 2. Valves/keys leak	1. Use neck or chest straps, floor stands, end pins ^c 2. Regular instrument maintenance
Flute	1. Wrist extreme flexion/deviation 2. Left index finger awkward posture 3. Short thumbs strain 4. Ring fingers straining to cover holes 5. Uncomfortable holding or playing	1. Lengthen keys for neutral left wrist ^c 2. Silicone tabs on keys to raise height ^a 3. Bo-pop thumb guides to maintain length ^a 4. Plug holes in the ring finger keys ^a 5. Custom fabricated orthosis ^a
Clarinet	1. Right thumb hypermobile metacarpophalangeal (MP) joint	1. Custom fabricated orthosis ^c
Bassoon	1. Excessive finger span	1. Add levers and extended keys ^b
String Instruments	1. Thumb carpometacarpal (CMC) joint arthritis or left thumb hypermobile MP joint 2. Heavy wooden fingerboard, heavy bow 3. De Quervain’s tenosynovitis of the right wrist 4. Ulnar nerve entrapment 5. Inability to hold instrument up 6. Excessive left hand strain	1. Custom fabricated orthosis ^c 2. Replace wood bow with carbon fiber and graphite compounds so it is lighter ^a 3. Avoid using the proximal third of the bow, release the thumb often and let the arm and wrist move freely, take every opportunity to rest the thumb ^{a,b} 4. Dangle and rest the arms whenever possible, avoid repeated elbow flexion and extension ^a 5. Modified music stand to “hold” the instrument ^a 6. Change to lighter-gauge strings ^b
Violin/Viola	1. Poor comfort/posture	1. Pellegrina viola or Maximilian Violin to improve comfort/posture and decrease physical stress ^a Electric violin to minimize friction of flexor tendons against transverse carpal ligament ^a
Guitar	1. Poor comfort/posture 2. Left hand or shoulder problems	1. Use small beveled edge to improve right-hand access to the strings ^b

		2. Place a capo on the third fret, decreasing the stress of supination with external rotation when playing on the first three frets ^b
Piano	1. Painful forearm overuse 2. Hands too small	1. Resume playing on a synthesizer or electronic keyboard using less force ^a 2. Steinbuhler Company of Pennsylvania makes a 7/8-size keyboard spanning 41 inches instead of the standard 48 inches ^a
Timpani and Percussion	1. Excessive gripping	1. Increase stick length or increase grip size ^a ; order oriented polymer drumsticks to stop vibration sooner and transmit less vibration up the arm ^a

Note: ^a*Playing (less) hurt: An injury prevention guide for musicians*, by J. Horvath, 2010, Hal Leonard Corporation. ^b*Rehabilitation of the Hand and Upper Extremity* (2nd ed.), by T. M. Skirven, A. L. Osterman, J. Fedorczyk, and P. C. Amadio, 2011, Elsevier Health Sciences. ^c“Hand Therapy for the Musician: Instrument-Focused Rehabilitation”, by J. Warrington, 2003, *Hand Clinics*, 19(2), 287-301.

Table 2
General Considerations

Considerations	Issue	Solution
Pain	Tingling, numbness, uncoordinated, joint instability	<ul style="list-style-type: none"> • Education on joint protection, adaptive tools, energy conservation, and use of modalities^d • Custom fabricated orthoses for acute inflammatory phase^d • Soft orthoses (e.g., neoprene) for relief^d • Kinesiotape for light support and biofeedback^c
Poor Posture	Tingling, numbness, discomfort, prolonged holding in one position	<ul style="list-style-type: none"> • Pain free stretch of what is tight; strengthen what is weak^b • Videotape, photograph, or use a mirror while playing instrument^b • Keep wrists in neutral alignment^b • Work in a forward position so that center of gravity is forward rather than thrust backwards^b • Keep music stand height where it keeps the head level^b
Time Playing Instrument	Musculoskeletal discomfort	<ul style="list-style-type: none"> • Encourage interspersing practice and playing with other activities; Balance activity with rest^c • Limit playing time^a • Physical warm-up and cool-down before and after playing^c • Encourage playing at a slower tempo^c • Discuss "graded-return-to-play" programs^c • Encourage mental practice without touching the instrument^c • Take frequent breaks (5-10 min) every hour of practice^c
Quality of Instrument	Sub-optimal instrument quality increases energy expenditure	<ul style="list-style-type: none"> • Make sure keys and valves on wind instrument is maintained^c • Make sure bridges on string instruments are not too high^c • Ensure pianos are in good condition^c
Temperature	Cold environment lessens sensory feedback	<ul style="list-style-type: none"> • Fingerless thermal gloves, warm clothing, portable heater^c
Hypermobility	Pain and joint laxity	<ul style="list-style-type: none"> • Isometric exercises, stability strengthening, and proprioception exercises^c • Orthoses and sensorimotor retraining^c
Focal Hand Dystonia	Lack of coordination, cramping, and tremor	<ul style="list-style-type: none"> • Reestablish sensory-motor control using sensory reeducation^c, limb immobilization^a, instrument modification^c, refer to psychotherapy^c

Note: ^a“Incidence of Overuse Syndrome in the Symphony Orchestra”, by H. J. Fry, 1986, *Med Probl Perform Art*, 1(2), 51-55. ^b*Playing (less) hurt: An injury prevention guide for musicians*, by J. Horvath, 2010, Hal Leonard Corporation. ^c*Rehabilitation of the Hand and Upper Extremity* (2nd ed.), by T. M. Skirven, A. L. Osterman, J. Fedorczyk, and P. C. Amadio, 2011, Elsevier Health Sciences. ^d“Hand Therapy for the Musician: Instrument-Focused Rehabilitation”, by J. Warrington, 2003, *Hand Clinics*, 19(2), 287-301.

Holistic Treatment from an OS Perspective

When faced with injury, musicians often cannot stop playing. The threat of injury, coupled with pain, may hinder optimal performance and drive musicians to lose sight of their identities. This negative impact on their primary occupation easily leads to anxiety about the future, as well as depression in struggling to find flow in their craft. Coined by psychologist Csikszentmihalyi, flow has been described as “a subjective, psychological state that occurs when people become so immersed in an occupation that they forget everything except what they are doing” (Wright, 2004, p. 66). While the history of flow in OS has largely been associated with positive health and well-being, one phenomenological study recognizes that flow may actually be detrimental for musicians (Guptill, 2012). This study shows that even professional musicians with PRMDs experience a decreased awareness of time when playing, particularly during periods of flow. Thus, flow may be a risk factor for injury because of the repetitive nature of the occupation when adequate breaks are not taken (Guptill, 2012).

Expanding on this concept of flow, occupational disruption occurs when musicians experience a PRMD that hinders their ability to play for a short period of time (Guptill, 2012). If the injury results in prolonged absence or unemployment, occupational deprivation may be experienced (Guptill, 2012; Whiteford, 2003). These occupational interruptions have the potential to evolve into social alienation if the injuries get worse, since musicians may stop playing and even socializing with their musical network. Once musicians are denied opportunities to engage in their most prized occupations, stress may ensue emotionally, physically, occupationally, financially, and socially (Zaza et al., 1998). To address this multidimensional stress, occupational therapists should place emphasis on maintaining a balanced lifestyle, as well as using strategies that address participation beyond the traditional physical ways of playing.

One way to do this is through occupational balance. Occupational balance relates to the way people allocate their time in organizing occupations in three performance areas: self-care, productivity, and leisure (Backman, 2004; Law, Polatajko, Baptiste, & Townsend, 1997; Specht, King, Brown, & Foris, 2002). Research over the past 3 decades has supported the notion that maintaining occupational balance leads to improved health and perceived well-being (Backman, 2004; Jonsson, Moller, & Grimby, 1999). One can only imagine how difficult maintaining a balanced lifestyle may be for musicians who have constantly changing schedules due to rehearsals, gigs, and concerts, among other life events. Balance is often influenced by the person’s perceived state of being; this includes attitudes, goals, and perspectives that interact with time and expectations of the sociocultural environment (Backman, 2004). One may consider addressing occupational balance through the use of a balance wheel, highlighting the musician’s time spent in productivity, rest, play, and self-care on any given day (Trickey, 1992). By understanding how musicians spend their time, therapists may better incorporate time management and pacing strategies into the treatment plan, among other interventions. The ability to address occupational balance will ultimately help to strengthen the musician’s ties to health and society.

Resources

Therapists seeking further guidance may consider partnering with a group of health care practitioners who have established themselves as specialists in the performing arts medicine community. One such group is the Performing Arts Medicine Association (PAMA), whose mission statement is to promote “the highest quality of care to all performing artists and bring to that care an appreciation of the special needs of performing artists” (n.d., para. 3). The PAMA may be a valuable resource or referral source for occupational therapists who wish to consult for or treat this population. Partnerships may also

be necessary, since musicians commonly seek alternative treatments, including acupuncture, the Alexander Technique, and the Feldenkrais Method (Jain, Janssen, & DeCelle, 2004; Lowe, 1992; Molsberger & Molsberger, 2012).

Other resources to consider include MusiCares and the Sweet Relief Musicians Fund for promoting the health and wellness of musicians. Formed under the Recording Academy, MusiCares is a charity service that “provides a safety net of critical assistance for music people in times of need” (Grammy, 2018, para. 1). MusiCares’ services go beyond merely the physical and cover all issues ranging from financial, medical, and personal emergencies. The Sweet Relief Musicians Fund, a nonprofit charity, strives to provide “financial assistance to all types of career musicians who are struggling to make ends meet while facing illness, disability, or age-related problems” (Sweet Relief, 2018). These two resources are only a few of many from which musicians may benefit, to either begin or continue on their paths of recovery.

Lastly, music schools and conservatories all around the United States are recognizing the need for developing musician wellness courses and centers to offer resources for music students, professors, and faculty. Participation in injury prevention and education courses may help music students improve their subjective body awareness and attitudes toward prevention strategies, as well as increase awareness of the health risks associated with performing music (Árnason, Briem, & Árnason, 2018; Matei, Broad, Goldbart, & Ginsborg, 2018). These resources ultimately prepare clients to develop and maintain healthy practices well into the later years of their careers. Occupational therapists interested in treating musicians should reach out to schools and universities nearby for partnerships and collaboration. Occupational therapists might be the musician’s first responders, and therefore play a critical role in identifying early warning signs and helping musicians return to prior levels of health, function, and playing.

Future Implications for Occupational Therapy Practice and Research

As the need for injury prevention in musicians becomes more recognized, the development of additional research and evidence-based practice to support optimal performance is crucial. It is important to use this collective term, PRMD, so that research for this specific topic may be organized to guide effective treatments. Using the term PRMD also provides a common vocabulary for discussion of a specific population with other health care practitioners and musicians.

Promoting occupational therapy’s role in the evaluation and treatment of musicians may help establish occupational therapists as primary health care leaders in performing arts medicine. General considerations and instrument modifications shown in Tables 1 and 2 give a brief overview of best practices; however, future dialogue and research to expand these tables may improve interventions for musicians. By tailoring our evaluation and treatment skills toward addressing subjective pain related to their practice and performance schedules, occupational therapists may better collaborate with musicians. Even though the DASH Performing Arts Module, Gradual Return-to-Play Schedules, and Grading of Severity of Injury Scale are free and easily attainable, how widely they are used is unknown. We recommend that future research may also be conducted to validate the effectiveness of the Grading of Severity of Injury Scale and Gradual Return-to-Play Schedules.

Finally, as music schools recognize the need for injury prevention education, more research is needed to explore the effectiveness of these courses. There are few health courses that have been formally evaluated related to injury prevention and wellness in musicians. Questions remain regarding what information such courses should contain, as well as who is most qualified to develop and teach

these courses (Matei et al., 2018). More research is needed to make sure future courses help students achieve optimal outcomes pertaining to their needs. Music schools across the United States may all benefit from collaboration with health care practitioners in directing these goals.

Conclusion

When musicians are seen with PRMD, health care practitioners must understand that musicians tend to reject the standard biomechanical approach. Functional outcome measures to guide treatment should include use of the DASH Performing Arts Module and the Grading of Severity of Injury Scale. These scales help quantify the musician's subjective experience related to PRMD. Occupational therapists must treat musicians holistically using activity analysis and treatment with their musical instrument(s). One may consider using the PAMA and surrounding music schools as potential resources if musician care is beyond the practitioner's scope. Throughout treatment, use of a Gradual Return-to-Play Schedule helps to outline a concrete playing time line while addressing the musician's need to play throughout the healing process. Using a comprehensive approach, occupational therapists will better understand how to evaluate and treat the musical population. As a result, musicians will seek occupational therapists as a trusted health care provider, thereby aligning with occupational therapy's strategic priorities included as part of AOTA's *Vision 2025*. The tools suggested here for evaluation and treatment are far from conclusive. However, these tools will help occupational therapists prioritize treatment and research from a musician's point of view. This emerging practice area requires additional dialogue and research to further decrease the risk of injury and help injured musicians recover.

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