



January 2024

When Music Becomes Me: Occupational Therapy's Role in Caring for Upper Extremity Disorders in Musicians

Kathryn S. Halsted

Rocky Mountain University of Health Professions - USA, halsted@etsu.edu

Kristin Biggins

Rocky Mountain University of Health Professions - USA, Kristin.Biggins@rm.edu

Kimberly Davis

Rocky Mountain University of Health Professions; Husson University - USA, kimberly.davis@rm.edu

Follow this and additional works at: <https://scholarworks.wmich.edu/ojot>



Part of the Music Commons, and the Rehabilitation and Therapy Commons

Recommended Citation

Halsted, K. S., Biggins, K., & Davis, K. (2024). When Music Becomes Me: Occupational Therapy's Role in Caring for Upper Extremity Disorders in Musicians. *The Open Journal of Occupational Therapy*, 12(1), 1-7. <https://doi.org/10.15453/2168-6408.2064>

This document has been accepted for inclusion in The Open Journal of Occupational Therapy by the editors. Free, open access is provided by ScholarWorks at WMU. For more information, please contact wmu-scholarworks@wmich.edu.

When Music Becomes Me: Occupational Therapy's Role in Caring for Upper Extremity Disorders in Musicians

Abstract

Musicians are a distinct population with a high rate of developing musculoskeletal and neurological disorders affecting their ability to participate in music-based occupations. These injuries negatively affect the musician's health and well-being in physical, financial, psychosocial, and emotional dimensions. Given music's complex and integrated role in the musicians' life, treatment must be multi-dimensional, considering aspects of the person, the type of instrument, environment, context, and social obligations. Occupational therapy providers are uniquely qualified to treat musicians because of their focus on holistic, occupation-based, and client-centered care. This manuscript describes the role of occupational therapy in this client population based on the best available evidence. It discusses the literature regarding the upper-extremity health challenges in musicians and the associated physical and psychosocial risk factors. Furthermore, the manuscript elucidates the foundational elements of occupational therapy in relation to musician-clients supporting this profession's profound role in musician health care. In addition, the manuscript employs the Person-Environment-Occupation-Performance model and the Occupational Adaptation frame of reference to promote an occupation-based and client-centered approach to musician-client care. With this information, occupational therapy providers will recognize the importance of client-centered and evidence-based care in this population and their role in caring for musicians with hand and upper extremity disorders.

Comments

The authors declare that they have no competing financial, professional, or personal interest that might have influenced the performance or presentation of the work described in this manuscript.

Keywords

evidence-based, instrumentalists, music, playing-related musculoskeletal disorders, prevalence

Credentials Display

Kathryn Halsted, OTD, MS, OTR/L, CPAM; Kristin Biggins OTD, OTR/L, CHT, CLT, PYT; Kimberly Davis OTD, MS, OTR/L

Copyright transfer agreements are not obtained by The Open Journal of Occupational Therapy (OJOT). Reprint permission for this Guidelines for Practice and Technological Guidelines should be obtained from the corresponding author(s). [Click here to view our open access statement regarding user rights and distribution of this Guidelines for Practice and Technological Guidelines.](#)

DOI: 10.15453/2168-6408.2064

Music-making is an art form that requires passion, commitment, and dedication. To develop a high level of mastery, musicians spend countless hours in personal practice or ensemble rehearsal. According to the U.S. Bureau of Labor Statistics (2021), 34,770 people in the United States are professionally employed musicians. Many more consider themselves amateur musicians. Creating music brings joy and fulfillment to many people across the world.

Nevertheless, the literature shows that musicians suffer from high rates of musculoskeletal disorders, particularly in the upper extremities (Ackermann & Altenmüller, 2021; Cruder et al., 2020; Kok et al., 2016; Kok et al., 2018; Steinmetz et al., 2015). The research refers to these disorders as playing-related musculoskeletal disorder/s (PRMD/s). The term PRMD also includes those disorders with a neurological origin, such as focal hand dystonia. Given that many professional and amateur music-makers experience PRMDs, it is incumbent on health care professionals to ensure they receive comprehensive care. This manuscript's purpose is to discuss the profound role occupational therapy (OT) can play in ensuring that musicians with upper-extremity disorders receive client-centered, evidence-based, and occupation-based care, enabling musicians to participate in this meaningful occupation.

The Musician and The Instrument

The literature reveals that musicians have a special connection between their mind, body, and instrument, which they believe affects the quality of the music produced. Schoeb and Zosso (2012) performed a phenomenological qualitative study that resulted in three emerged themes. The Music as Art theme revealed the strong link between identity and being a musician and that music is a passion and a pleasure, not only a job. The participants spoke on how performing is physically and emotionally taxing and requires long hours and dedication to gain and maintain a high-performance level, which adds complexity to their lives. In the Health of Musicians theme, the participants reflected on the impact of posture and pain on musical quality and revealed that poor health limits creative expression. In the Learning Through Experiences theme, the participants placed the learning process as central to health. They discussed developing self-awareness by using tools and resources, such as health professionals, friends, and professionals from other disciplines (Schoeb & Zosso, 2012).

Other researchers have found similar results. In a mixed-methods study by Ackermann and Altenmüller (2021), the participants described how they previously experienced a disconnect between their posture and the movements of the hands and fingers. They emphasized that addressing the whole body improved their playing tremendously. Furthermore, the participants recognized the importance of mental exercises in regaining health and musical skills (Ackermann & Altenmüller, 2021). These themes illustrate the importance of health to musicians, the deep connection with their craft, and the importance of a holistic and whole-body approach.

Moreover, music is a physically demanding art, and those demands vary based on the instrument used to create the music. In a clinical commentary by Nolet (2013), the author describes how a 4-min section of a Mendelssohn piano fantasy contains 5,595 notes, and every second of play entails 72 bimanual finger movements. This description illustrates the musician's extreme precision, speed, and skill and the amount of time and practice involved in developing these attributes.

Each instrument carries a different physical load for the musician because of the various shapes, weights, materials, playing posture, and method of sound production. A professional orchestral musician will have different needs than a student in a jazz band or a percussionist in a rock band. Each style of music and repertoire brings nuances to the musician-instrument relationship, which changes the dynamics and effects of the occupation on the musician. The variations in posture, sound production, and style of

play are diverse, and the impact on the musician will emerge in a myriad of ways. Therefore, occupational therapists and occupational therapy assistants treating musicians need to be aware of the intricacies of the instruments used by the musician, understand the music's style and demands, and recognize the importance of musical identity and roles and the impact of pain and dysfunction on the musician as a whole.

The Need: Incidence and Prevalence

The research on musculoskeletal disorders in musicians has revealed an astonishingly high prevalence rate of professional, student, and amateur musicians experiencing PRMDs (Ackermann & Altenmüller, 2021; Cruder et al., 2020; Kok et al., 2016; Kok et al., 2018; Steinmetz et al., 2015). Steinmetz et al. (2015) conducted a cross-sectional study of 720 professional orchestral musicians to evaluate the frequency of PRMDs. In addition to demographics and medical history, the researchers gathered information about pain factors, coordination deficits, and stage fright intensity. They found that 89.5% of the participants reported current or past PRMDs, 62.7% reported pain in the last 3 months, and 8.6% reported current pain (Steinmetz et al., 2015). Similarly, the systematic review by Kok et al. (2016) of 21 articles representing 5,424 musicians found that 41% to 93% reported experiencing PRMDs in the past year and that 62% to 93% had experienced PRMDs during their lifetime.

Cruder et al. (2020) also found high rates of PRMDs in the Risk of Music Students research project. This longitudinal study involved 850 music students across 17 European countries. The results revealed that 408 participants (48%) self-reported PRMDs, and 152 participants (18%) reported having a musculoskeletal condition (Cruder et al., 2020). In addition, the cross-sectional study by Kok et al. (2018) found high rates of PRMDs among amateur musicians. The researcher's questionnaire combined the performing arts module of the Disability of Arm, Shoulder, and Hand with several other outcome measures. The results analysis showed that 67.8% of the 357 participants reported pain and dysfunction impacting their music-based occupations during the past year, 37.3% in the past 3 months, 33.6% in the past 4 weeks, and 26.9% in the past week (Kok et al., 2018).

Finally, Steinmetz et al. (2012) conducted a prospective non-randomized cross-sectional case-control designed study to compare the rate of musculoskeletal disorders in student musicians to that of non-musician students. Logistic regression and chi-squared tests showed that student musicians exhibited 6.19 pain regions and 8.39 musculoskeletal dysfunctions compared to 4.31 pain regions and 4.37 dysfunctions in non-musician students. Furthermore, 81% of the student musicians reported pain during instrument play, and more than 40% claimed that pain was always or very often present (Steinmetz et al., 2012). These studies indicate that musicians are experiencing a high incidence and prevalence of PRMDs compared to non-musicians.

The Need: Psychosocial Factors, Anatomical Locations, Risk Factors, and Pathology

While the literature reveals a high prevalence of PRMDs among musicians, it also discusses commonly affected anatomical sites, the types of disorders and injuries, and associated risk factors impacting musicians. Steinmetz et al. (2012) conducted a physical examination as a part of their cross-sectional study comparing signs and symptoms of PRMDs in music and non-music students. The results showed statistically significant results for musicians having scapular alata (odds ratio [OR] = 4.31; $p < 0.05$), decreased cervical range of motion ($p < 0.05$), and first rib end play restriction ($p < 0.05$). In addition, musicians were nearly seven times more likely to experience symptoms similar to De Quervain's Tenosynovitis as assessed by the Finkelstein's test (OR = 6.94), though this finding did not reach statistical significance (Steinmetz et al., 2012). In addition, the cross-sectional study by Steinmetz et al. on 480

professional orchestral musicians found high percentages of pain in the neck (72.8%), left shoulder (55.1%), right shoulder (52.2%), and left wrist (55.1%). The participants also reported other conditions that interfered with playing, such as finger coordination impairment (7.8%) (Steinmetz et al., 2015).

Several studies found common risk factors associated with musicians, including psychosocial factors. The cross-sectional study by Kok et al. (2018) discovered that risk factors of a sudden increase in play (OR = 0.96; CI = 0.90 ± 1.04), high body mass index (OR = 1.10; CI = 1.00 ± 1.21), and female gender (OR = 2.90; CI = 1.78 ± 4.77) were associated with PRMDs in amateur musicians. Steinmetz et al. (2015) found a statistically significant result that age ($p < 0.05$), female gender ($p < 0.05$), and the number of years of orchestral play ($p < 0.05$) correlated strongly with the development of PRMDs in the upper extremities. Cruder et al. (2021) discovered that playing posture, such as both arms elevated ($p < 0.001$), contributed to increased incidence of PRMDs, as did female gender ($p < 0.05$). Psychosocial factors, such as elevated stage fright ($p < 0.05$) in the Steinmetz et al. (2015) study and increased psychological distress ($p < 0.001$) and high levels of perfectionism ($p < 0.01$) in the Cruder et al. (2021) study, correlated strongly with increased incidence of PRMDs.

The locations and risk factors associated with PRMDs lead to the question of the pathologies seen in this population. The clinical commentary by Sheibani-Rad et al. (2013) reported that the most common PRMDs are overuse syndromes, including tendinopathies, nerve entrapment, focal dystonia, osteoarthritis, and joint hypermobility. The Moraes and Antunes (2012) systematic review of 30 articles found that the most observed musculoskeletal disorders are overuse (50%), nerve compression or thoracic outlet syndrome (20%), and focal dystonia (10%) and that up to 85% of musicians may experience limb tiredness or heaviness or a burning sensation as initial symptoms of a PRMD.

The conclusions from this literature review demonstrate that the musician population has a high incidence and prevalence of PRMDs that affect the upper extremities or adjacent anatomical locations. Several studies have found gender, posture, years of play, and psychosocial aspects to be risk factors for developing PRMDs. Given the evidence, the need for competent health care to address PRMDs in the musician population is apparent.

OT and The Musician

OT's holistic and client-centered approach to treatment is well suited to address the specific physical and psychosocial needs of musicians with PRMDs. The *Occupational Therapy Practice Framework: Domain and Process* (OTPF-4) describes people as occupational beings and expounds on the central belief that a positive relationship between occupation and person is essential for health and occupational identity (American Occupational Therapy Association [AOTA], 2020). Occupational therapists and occupational therapy assistants use clinical reasoning, problem-solving, and function-based treatment while considering all domains, including the occupation, context, performance patterns and skills, and client factors. The definitions and language of the OTPF-4 support and define the scope of occupational therapists and occupational therapy assistants in providing musicians with the client-specific care they require (AOTA, 2020). Furthermore, OT seeks to provide effective, accessible, and client-centered care as established by *Vision 2025* (AOTA, 2017).

A Client-Centered Occupation-Based Approach

Musicians can benefit from the client-centered occupation-based approach to treatment that is foundational to OT. Occupational therapists and occupational therapy assistants have several established theories, models, and frames of reference to achieve this approach in musician-clients. The Person-Environment-Occupation-Performance (PEOP) model incorporates these four components into critical

thinking and treatment development while emphasizing the importance of the client narrative (Christiansen & Baum, 1991). The Occupational Adaptation frame of reference is ideal for translating PEOP to the musician client. It prioritizes the therapeutic relationship and aids the client in facilitating changes in the internal adaptation process to meet the need of the environmental context (Schkade & Schultz, 1992). Figure 1 proposes a diagram of integrating PEOP and occupational adaptation principles into a treatment design for a musician. It provides insight into specific considerations for musicians in the domains fundamental to the PEOP model.

Figure 1

Using PEOP and OA Principles to Treat Musicians



Note. Content developed using PEOP and OA principles (Christiansen & Baum, 1991; Schkade & Schultz, 1992).

Some researchers have advocated for a frame of reference designed explicitly for musician clients. Bastepe-Gray et al. (2021) recently developed a novel frame of reference called the Ecology of Musical Performance. It contains three concentric contexts that encompass and organize the needs and priorities of the musician to aid in intervention planning and goal setting. The outer ring is the peripheral context, which includes activities of daily living, leisure, and non-music-related work and activities. The middle ring is the immediate context encompassing maintenance of skills, skill acquisition, performance, environmental considerations, music workload, and practice behaviors. The central ring and core of the model is the Musician-Instrument-Repertoire Complex defined as an interactive system resulting from frequent engagement with the instrument and a driving factor in the continuation of the musician role (Bastepe-Gray et al., 2021). Occupational therapists and occupational therapy assistants should carefully consider the theories and frames of reference they employ to ensure their reliability and validity concerning the client population.

Occupational therapists and occupational therapy assistants should consider aspects particular to the musician-client population throughout evaluation, intervention planning, and goal setting. An example treatment scenario is outlined in Figure 2. Some of the musician-client-specific factors include the instrument (weight, structure, material), play style and repertoire, posture during play, and the number of years the musician has played. Equally important are their practice habits. Musicians may have deeply ingrained habits from years of poor playing posture or technique, leading to the development of PRMDs. It is imperative to recognize that making even subtle changes to technique will take significant effort and dedication. PRMDs may also impact activities of daily living and other non-music occupations, which can lead to additional physical and psychosocial stresses. Therefore, it is vital to incorporate these deficits into the treatment strategy. Furthermore, it might not be possible to take time away from the instrument for rest. By incorporating the instrument into the treatment process, occupational therapists and occupational therapy assistants provide client-centered and occupation-based treatment to this vulnerable population.

Figure 2

Musician-Client Therapy Flow Example



Scenario: Student clarinetist with persistent pain in the right thumb and wrist resulting in increased inability to meet their music program's expectations.

Note. Content derived using PEOP and OA principles (Christiansen & Baum, 1991; Schkade & Schultz, 1992).

Prevention Strategies

Prevention is an essential component of care that OT can provide for musicians. The literature shows various prevention techniques, including educational workshops for students and onsite triage units for professional orchestral musicians (Chan et al., 2013; Wolf et al., 2021). Wolff et al. (2021) conducted a randomized control pilot trial of an injury prevention workshop for student musicians attending an 8-week intensive summer music festival. The intervention group included education about relevant anatomy and practical advice for preventing injury, including warm-up exercises, taking breaks, playing posture, and specific stretches and exercises to perform before practice, during breaks, and after playing. The program results showed a statistically significant reduction in pain interfering with playing (CI 95% = -9.26-0.11, $p = 0.055$) and reduced incidence of pain (baseline = 53%, post workshop = 21%). Though it did not reach statistical significance, the intervention group also saw reduced pain intensity (CI 95% = -4.41-8.17, $p = 0.551$) (Wolf et al., 2021).

Prevention strategies focused on developing positive practice habits and posture during play may reduce the likelihood of PRMD development (Chan et al., 2013; Wolf et al., 2021). Applying these strategies may provide long-term benefits, but more research is needed to verify. Prevention programs will need the support of music professors and professional organizations. Therefore, occupational therapists and occupational therapy assistants seeking to establish prevention programs or research prevention of PRMDs will need to develop a robust working relationship with music professionals to ensure the programs are effective, used, and meet the needs of the musicians and the organizations.

Conclusion

OT is a holistic and client-centered profession whose heart is the essential nature of the occupation. This focus on occupation is of tremendous value to the musician. A musician's craft brings immense meaning and fulfillment to their life and may be their financial means of support. Occupational therapists and occupational therapy assistants have the opportunity to address the musician population's needs by incorporating the instrument into the treatment process, facilitating an improved musician-instrument-environment relationship, and addressing psychosocial risk factors as outlined in Figures 1 and 2. The research has clarified the impact of PRMDs on musicians and participation in this meaningful occupation. However, there is a lack of research on the best intervention strategies, prevention strategies, and the psychosocial risk factors that most impact this population. OTs can play a profound role in furthering the knowledge base for performing arts medicine through research, advancing evidence-based practice, developing prevention programs while engaging with musical professionals, and using occupations to improve the lives of musicians suffering from upper extremity disorders. These actions will lead to discovering new ways to treat the musicians with effective, accessible, and client-centered treatment.

References

- Ackermann, B., & Altenmüller, E. (2021). The development and use of an anatomy-based retraining program (MusAARP) to assess and treat focal hand dystonia in musicians: A pilot study. *Journal of Hand Therapy, 34*(2), 309–314. <https://doi.org/10.1016/j.jht.2021.05.007>
- American Occupational Therapy Association. (2017). Vision 2025. *American Journal of Occupational Therapy, 71*, 7103420010. <https://doi.org/10.5014/ajot.2017.713002>
- American Occupational Therapy Association. (2020). Occupational therapy practice framework: Domain and process (4th ed.). *American Journal of Occupational Therapy, 74*(Suppl. 2), Article 7412410010. <https://doi.org/10.5014/ajot.2020.74S2001>
- Bastepe-Gray, S., Riley, M. A., Klotchkov, N., Supnekar, J., Filippi, L., & Raghavan, P. (2021). Ecology of musical performance as a model for evaluation and treatment of a musician with a playing related musculoskeletal disorder: A case report. *Journal of Hand Therapy, 34*(2), 330–337. <https://doi.org/10.1016/j.jht.2021.04.025>
- Chan, C., Driscoll, T., & Ackermann, B. (2013). The usefulness of on-site physical therapy-led triage services for professional orchestral musicians - A national cohort study. *BMC Musculoskeletal Disorders, 14*, 98. <https://doi.org/10.1186/1471-2474-14-98>
- Christiansen, C., & Baum, C. (1991). *Occupational therapy: Overcoming human performance deficits*. SLACK.
- Cruder, C., Barbero, M., Koufaki, P., Soldini, E., & Gleeson, N. (2020). Prevalence and associated factors of playing-related musculoskeletal disorders among music students in Europe. Baseline findings from the Risk of Music Students

- (RISMUS) longitudinal multicentre study. *PloS One*, 15(12), e0242660. <https://doi.org/10.1371/journal.pone.0242660>
- Cruder, C., Barbero, M., Soldini, E., & Gleeson, N. (2021). Patterns of pain location in music students: A cluster analysis. *BMC Musculoskeletal Disorders*, 22(1), 184. <https://doi.org/10.1186/s12891-021-04046-6>
- Kok, L. M., Huisstede, B. M., Voorn, V. M., Schoones, J. W., & Nelissen, R. G. (2016). The occurrence of musculoskeletal complaints among professional musicians: A systematic review. *International Archives of Occupational and Environmental Health*, 89(3), 373–396. <https://doi.org/10.1007/s00420-015-1090-6>
- Kok, L. M., Groenewegen, K. A., Huisstede, B., Nelissen, R., Rietveld, A., & Haitjema, S. (2018). The high prevalence of playing-related musculoskeletal disorders (PRMDs) and its associated factors in amateur musicians playing in student orchestras: A cross-sectional study. *PloS One*, 13(2), e0191772. <https://doi.org/10.1371/journal.pone.0191772>
- Moraes, G. F., & Antunes, A. P. (2012). Musculoskeletal disorders in professional violinists and violists. Systematic review. *Acta Ortopedica Brasileira*, 20(1), 43–47. <https://doi.org/10.1590/S1413-78522012000100009>
- Nolet, R. (2013). Virtuoso hands. *Clinical Rheumatology*, 32(4), 435–438. <https://doi.org/10.1007/s10067-013-2186-6>
- Schkade, J. K., & Schultz, S. (1992). Occupational adaptation: Toward a holistic approach for contemporary practice, Part 1. *The American Journal of Occupational Therapy*, 46(9), 829–837. <https://doi.org/10.5014/ajot.46.9.829>
- Schoeb, V., & Zosso, A. (2012). “You cannot perform music without taking care of your body”: A qualitative study on musicians’ representation of body and health. *Medical Problems of Performing Artists*, 27(3), 129–136. <https://doi.org/10.21091/mppa.2012.3024>
- Sheibani-Rad, S., Wolfe, S., & Jupiter, J. (2013). Hand disorders in musicians: The orthopaedic surgeon’s role. *The Bone & Joint Journal*, 95-B(2), 146–150. <https://doi.org/10.1302/0301-620X.95B2.30092>
- Steinmetz, A., Möller, H., Seidel, W., & Rigotti, T. (2012). Playing-related musculoskeletal disorders in music students-associated musculoskeletal signs. *European Journal of Physical and Rehabilitation Medicine*, 48(4), 625–633.
- Steinmetz, A., Scheffer, I., Esmer, E., Delank, K. S., & Peroz, I. (2015). Frequency, severity and predictors of playing-related musculoskeletal pain in professional orchestral musicians in Germany. *Clinical Rheumatology*, 34(5), 965–973. <https://doi.org/10.1007/s10067-013-2470-5>
- U.S. Bureau of Labor Statistics. (2021, March 31). *27-2042 musicians and singers*. U.S. Bureau of Labor Statistics. Retrieved January 25, 2022, from <https://www.bls.gov/oes/current/oes272042.htm>
- Wolff, A. L., Ling, D. I., Casey, E. K., Toresdahl, B. G., & Gellhorn, A. C. (2021). Feasibility and impact of a musculoskeletal health for musicians (MHM) program for musician students: A randomized controlled pilot study. *Journal of Hand Therapy*, 34(2), 159–165. <https://doi.org/10.1016/j.jht.2021.04.001>

If you enjoyed this article and are able to give, please consider a contribution to support OJOT’s mission of providing open-access to high quality articles that focus on applied research, practice, education, and advocacy in the occupational therapy profession. <https://secure.wmualumni.org/s/give?funds=POJO>