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Healthy Cello Playing: Teaching Cello to Promote Injury Prevention

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Annotated Bibliography

Abstract:

Cellists and other instrumentalists frequently suffer from playing-related injuries, and these can be detrimental to their career and psychological health. There are many ways to treat these injuries, but the most beneficial method is prevention. I want to find ways to help prevent pain and injury by developing good habits in the beginning of their playing. A lack of body awareness is a frequent cause of injury for many musicians. My goal in this research is to find ways of preventing injuries throughout one's playing career, but more specifically from the very early stages of cello-playing, so that these issues do not become a problem when the stakes are higher. I want to consolidate ways to integrate movement systems, body awareness, healthy practice habits, singing and others into cello pedagogy to help prevent injuries later on.

1. Bosanquet, R. Caroline. "The Development of Cello Teaching in the Twentieth Century." In *The Cambridge Companion to the Cello*, edited by Robin Stowell, 195–210. Cambridge: Cambridge University Press, 1999.

This essay surveys the major teachings of cello throughout the Twentieth Century. Some technique understood by major cellists and teachers at the time, like Pablo Casals and Alfred Piatti created undue tension that in large part still exists today. Teachings like keeping as many fingers down at the same time and starting beginners in first position were common at this time, and are still largely taught today. This essay states that significant developments and evolution in cello teaching did not take place until 1940 and on. This is when the concept of fluid and natural movements became commonplace. The teachings of Kodaly, Suzuki and Rolland are explored for their contributions to teaching beginners in a holistic manner. Much of the more recent pedagogical methods focus on freeing up a player's body and preventing fear of playing in higher registers. Bosanquet says that, while cello teaching and technique have come a long way since the beginning of the twentieth century, there is still need for improvements, as tense playing still exists. She cites big issues of this being the lack of ergonomic quality of cases and chairs for cellists.

Caroline Bosanquet was a British cellist, and wrote the books *The Secret Life of Cello Strings: Harmonics for Cellists.* She was also a prominent music educator and composer. This essay provides valuable context and history of cello teaching methods which form the basis of modern technique, and may give insight into some sources of tension experienced by cellists today.

2. Bosi, Braulio. "The Reality of Injuries in a Musician's Career." *American Music Teacher* 67, no. 1 (2017): 16–20. https://www.jstor.org/stable/26387706.

This article describes the significant number of musicians who suffer injuries during their education and career as well as the effect that this has on their mental health. Bosi cites multiple studies on both professional and student musicians that show an alarming percentage of

musicians who experience significant injury, as well as the unwillingness of musicians to seek professional help for their injuries, as it may well mean time off from playing due to issues such as income loss. This has dire effects on the mental well-being of musicians, and Bosi uses this as the argument for why prevention is the best approach to performance-related injuries. He cites proper warm-ups, taking breaks and proper posture and technique as some ways of prevention. In many of the studies mentioned, the percentages vary up to sixty percent for the same statistic. He also includes a study that claims that women are at a higher risk for performance injuries. These statistics leave some desire for clarity and more information, yet they do successfully show the significance of injury prevention for musicians.

Braulio Bosi is a classical guitarist who has successfully competed in multiple competitions. He holds degrees from the Federal University of Espírito Santo (Brazil), Oklahoma City University and the University of Missouri-Kansas City. This article's discussion of the physical, psychological, economical and possible career-ending effects of music-related injuries gives valuable relevance to the need for injury prevention methods for all musicians.

3. Carpinteyro-Lara, Gustavo. "The Application of the Kinesthetic Sense: An Introduction of Body Awareness in Cello Pedagogy and Performance." D.M.A. Diss., University of Cincinnati, 2014. https://du.idm.oclc.org/login?url=https://www.proquest.com/dissertations-theses/application-kinesthetic-sense-introduction-body/docview/1545895233/se-2.

In this dissertation, Gustavo Carpinteyro-Lara explores different somatic practices and applying the kinesthetic sense to cello playing. Kinesthetic sense is described as the awareness of the body and its size and how it relates to movement. Feldenkreis and Alexander techniques rely on the principle of creating maximally effective results with the least amount of effort, and this is explored through the different pedagogical methods described. Many cellists are aware of things they need to fix in their playing, but are so rarely aware of what they may be doing in their body which is causing tension and issues. Some ways that Carpinteyro-Lara recommends applying these techniques to cello playing are in the way that cellists sit and how they use the bow and the left arm. In sitting, it is suggested that sits forward on a chair, understanding that the pelvis is the center of power and balance in a sitting position and that it should remain flexible while sitting, and should apply yogic breathing exercises. For the bow arm, he discusses ways to map movements in the body, and transfer the weight from the shoulder all the way through the arm and into the bow on the string. The left arm must also be balanced, and have a sense of weight that transfers to the fingers on the cello.

Gustavo Carpinteyro-Lara submitted this dissertation as part of the completion of his D.M.A. in Cello Performance at the University of Cincinnatti College Conservatory of Music. He is an experienced cello teacher and professor. This document provides valuable teaching recommendations that are based in body awareness. This is an aspect that many of my sources have discussed as lacking in cellists and musicians, and consequently as a contributing factor to injuries. Therefore, this dissertation may support my research for healthy approaches to cello playing and pedagogy.

4. Casas-Mas, Amalia, Guadalupe López-Íñiguez, Juan Ignacio Pozo, and Ignacio Montero. "Function of Private Singing in Instrumental Music Learning: A Multiple Case Study of Self-Regulation and Embodiment." *Musicae Scientiae* 23, no. 4 (2019): 442–464. https://doi-org.du.idm.oclc.org/10.1177/1029864918759593.

In this report, the authors describe a study done in which several string players (flamenco, jazz and classical guitarists and two cello students) were observed in their lessons. The goal of the study was to see the role that singing takes place in instrumental lessons, as well as the role that singing inhabits. Classical guitarists were observed as utilizing more "explicit" singing than the flamenco and jazz guitarists, who often used guttural sounds and breathing between phrases. Singing was observed as a tool for finding the right notes on the instrument, internalizing certain passages or musical phrases. In the cello students, singing techniques were observed in connection with emotional expression and for finding a flow with the music. The authors conclude that singing techniques have a valuable place in instrumental music learning, and that it can have an important role in internalization of musical flow and expression.

Amalia Casas-Mas, Juan Ignacio Pozo and Ignacio Montero all teach at the Universidad Autónoma in Madrid, Spain and Guadalupe López-Íñiguez teaches at the University of the Arts in Helsinki, Finland. This report offers valuable evidence to the inclusion of singing techniques in instrumental lessons. In the music internalization benefits of these singing techniques, one may find some supporting methods leading to a holistic teaching approach.

5. Cygańska, Anna, Aleksandra Truszczyńska-Baszak, and Paweł Tomaszewski. "Impact of Exercises and Chair Massage on Musculoskeletal Pain of Young Musicians." *International Journal of Environmental Research and Public Health* 17 no. 14 (2020): 5128. https://doi.org/10.3390/ijerph17145128.

This article explores different prophylaxis techniques on musicians and claims that chair exercises and massage are effective means of mitigating pain. The study on which these findings were based consisted of a group of 16 musicians who had chair massage twice a week for fifteen minutes each, a group of 14 musicians who did chair exercises for fifteen minutes twice a week, and a control group of fourteen musicians. Pressure sensitivity of trigger points was significantly decreased in both the massage and exercise groups. The study seemed to show that massage was slightly more beneficial than just the exercises on their own. Benefits went beyond increase in pain/sensitivity threshold in playing; subjects of the study also experienced less stress, better sleep and other areas of improvement and comfort. The authors claim that education regarding pain and injury as well as their sources and causes should be combined with the exercise and chair massage for the best results.

This study also surveyed a large number of musician and found an exceedingly high percentage of playing related musculoskeletal disorders (PRMD) in musicians, also determining a higher number and shorter weekly playing time in women as compared to men. Some limitations of the study include the inability to perform the study on individual instrument groups. The findings of this study may give valuable tools for how to maintain our bodies, both from a teacher's and performer's perspective.

All three authors of this article teach at Józef Piłsudski University of Physical Education in Warsaw, Poland. Anna Cygańska and Aleksandra Truszczyńska-Baszak are both Faculty of Rehabilitation and Paweł Tomaszewski is Faculty of Physical Education.

6. Fry, Hunter J. H., and Glenn L. Rowley. "Music Related Upper Limb Pain in Schoolchildren." *Annals of the Rheumatic Diseases* 48, no. 12 (1989): 998–1002. https://doi-org.du.idm.oclc.org/10.1136/ard.48.12.998.

This article outlines a study conducted which compared hand and arm pain of students in two schools in England: a music school and a regular school. There was a significantly higher report of pain of students at the music school, and evidence that this pain was ongoing and developed from a continuous activity, as opposed to examinations or a sporting match, for instance. In this study, the cello was the instrumental group with the highest percentage of reported pain. This group also happened to be the smallest of those analyzed, perhaps eliciting the need for more data. It became clear that all ages need education on healthy playing. This study, as in Bosi's article and the study of chair exercise and massage, suggests a possible higher risk of injury in women, both in the non-music school group (most often related to writing) and, less significantly, in the music group. As previous sources have mentioned, many students involved in this study subscribed at some level to the dangerous "No pain, no gain" approach. It also cites excessive tension and possible technical oversights as cause of injury, rather than overuse alone. In the conclusion, the authors call for a need to educate music students on specific muscle strength and sources of power needed for their individual instrument, much like in the chair massage and exercise study.

Hunter J. H. Fry is an Australian surgeon, and he holds degrees in medicine and music. Glenn L. Rowley was Principal Research Fellow in the Teaching, Learning and Leadership of the Australian Council for Educational Research, and held multiple university faculty positions. The age and skill level statistic and the high percentage of cello-related injuries found in this study may provide context and relevancy to pedagogy for long-term healthy playing.

7. Lee, Sang-Hie, Stephanie Carey, Rajiv Dubey, and Rachel Matz. "Intervention Program in College Instrumental Musicians, with Kinematics Analysis of Cello and Flute Playing: A Combined Program of Yogic Breathing and Muscle Strengthening-Flexibility Exercises." *Medical Problems of Performing Artists* 27, no. 2 (2012): 85–94. https://du.idm.oclc.org/login?url=https://www-proquest-com.du.idm.oclc.org/scholarly-journals/intervention-program-college-instrumental/docview/1266771216/se-2.

In this article, the authors outline a small study in which fifteen college musicians were given an intervention program of yogic breathing and physical therapy exercises. In this study, they determined that this kind of training positively affects musicians in terms of mental and physical health, including improvement of posture and flexibility. Students were to submit a survey of their playing and overall health, and while many considered themselves to be healthy, most had poor eating and exercise habits. An issue with the study was that only a very small number of the PME surveys were collected after the study, which made direct comparisons of before and after the training difficult. However, there was enough data and feedback to

determine that students gained additional physical and postural awareness and that the breathing exercises gave them a healthy way to deal with nerves. Prior to and at the end of the training, one cellist and one flutist were measured using kinematic motion analysis. The cellist had markedly improved range of motion and rotation, as well as posture after the training, and the flutist was observed shifting more between both feet, also indicating some improved body awareness and balance from the exercises. This study provides some further options for injury prevention and healthy mental practices as musicians.

The authors are all professionals in medicine or music. Sang-Hie has a PhD and is Associate Professor of Music at the College of the Arts at the University of South Florida. Stephanie Carey and Rajiv Dubey both work at the Center for Assistive, Rehabilitation and Robotics Technologies, as the Research Coordinator and Director, respectively. Dr. Dubey is also Professor and Chair of the Department of Mechanical Engineering, and Dr. Carey is an assistant research professor in the same department, both at the University of South Florida. Rachel Matz is the principal tuba at the Tallahassee Symphony Orchestra as well as the Gainesville Chamber Orchestra.

8. Pemoff, Adriana, Hernan Blanchetiere, Ivonne Gomez Avellaneda, Candelaria Torre, and Fernanda Coscueta. "Overuse Syndrome: A Prospective Study in Argentinean Instrumentalist Musicians." *Hand* 11, no. 1 (2016): 81S–82S. https://doi-org.du.idm.oclc.org/10.1177/1558944716660555ex.

This article discusses a study conducted over 15 years on 782 instrumentalist musicians in Argentina. Of these, 387 of them showed signs of overuse syndrome. They were evaluated, treated, and attended follow up appointments every month until the symptoms were resolved. As in many other articles on this topic previously discussed, lack of warm up, aerobic fitness, taking breaks and stretching as well as high work/study demand were cited as dominant causes of injury. One risk factor that this article addressed and that others have not is simply carrying the instruments. The treatment plans focused on conditioning muscles by strengthening and releasing and myofascial release of tissue. As in some of the other articles, the authors here call for the need for art and science to further align themselves so that this group can experience better treatment and prevention techniques for injury.

Fernanda Coscueta works at the Fundación Las Manos del Músico in Buenos Aires. Adriana Pemoff, Hernan Blanchetiere, Ivonne Gomez Avellaneda and Candalaria Torre all work both at the Hospital General of Agudos Juan A. Fernandez in Buenos Aires, Argentina and the Fundación Las Manos del Músico. Fernanda Coscueta works at the Fundación Las Manos del Músico in Buenos Aires. This article provides further evidence of lack of prevention techniques in musicians which lead to injury.

9. Powell, Douglas H. "Treating Individuals with Debilitating Performance Anxiety: An Introduction." *Journal of Clinical Psychology* 60, no. 8 (2004): 801–808. https://doi-org.du.idm.oclc.org/10.1002/jclp.20038.

This article introduces the condition of debilitating performance anxiety, and how it differs from other social phobias. It is part of a larger issue, of which subsequent articles discuss

treatment options for this condition. Performance anxiety, for instance, is defined by the focus that one who experiences it puts on themselves, whereas those who suffer from social phobia are much more focused on and concerned by how they are viewed by others. People in many different disciplines suffer from debilitating performance anxiety, including musicians, athletes, test-takers, public speakers and others. Similar to PRMDs discussed in previous articles, this type of anxiety affects the quality and comfort of performance for musicians.

While not directly discussing performance injuries, this article may provide key context for the overall health of musicians, as so much of the mental and physical aspects of music performance are interrelated. Douglas Powell works as a clinical psychologist at the Psychology Department of the Harvard Medical School, and has spent a large amount of his career working with individuals with debilitating performance anxiety.

10. Sazer, Victor. *New Directions in Cello Playing.* Los Angeles, Of Note, 1995.

This book begins with a forward by Paul Katz, cellist of the Cleveland Quartet. Victor Sazer's book on cello playing is a thorough dive into specific ergonomic factors applied to cello technique. He discusses the relevance of a book of this nature in Part 1, citing the incredibly high number of injuries in musicians, as well as how unwilling many are to seek help. In Part 2, Sazer more seriously begins the conversation on body awareness, balance, power, and sitting with the cello in an ergonomic way. In Part 3, he goes into depth with how to align the body and the cello. He believes that sitting with the cello slightly to the left instead of dead center prevents the bow arm from reaching with unnecessary tension. Part 4 outlines various bowing patterns and positions, and Part 5 discusses everything to do with the left hand, from placing the fingers to shifting and vibrato. In this last part, he suggests a release of the thumb from the fingerboard, which is very contradictory to most cello pedagogy. Many of the demonstrations which he suggests through the book completely, or at least somewhat, contradict the way many cellists are taught to sit with and play the cello. All of these demonstrations target a much more natural, movement-based approach to cello-playing. This book largely encourages cellists to use the way our bodies naturally respond to movement to play the cello, rather than trying to put a one-size fits all approach to technique.

Victor Sazer was a successful professional cellist and established teacher in his life, and studied with some of the top pedagogues in the country, including with Leonard Rose during his time at Juilliard. He played with the Houston Symphony and had a rich career in Los Angeles as a recording artist and chamber musician. Sazer also served as professor of cello and chamber music at California State University at Long Beach. He also served as California State President of the American String Teacher Association and co-founded the ASTA Summer Institute of Chamber Music as well as the Los Angeles Violoncello Society. This book provides a plethora of creative and ergonomic options for cello playing and is therefore a rich jumping off point for teaching and playing the cello pain-free.

11. Yang, N., D.T. Fufa, and A.L. Wolff. "A Musician-Centered Approach to Management of Performance-Related Upper Musculoskeletal Injuries." *Journal of Hand Therapy* 34, no. 2 (April 2021): 208–216. https://doi.org/10.1016/j.jht.2021.04.006.

This article addresses musicians as specialized performers like athletes and, as such, that they too need highly specific treatment plans when injury occurs. It isn't enough to simply treat musicians different from other occupations, so this paper goes into detail about the biomechanics specific to each instrument or instrument group. The goal of this article is to provide a musician-specific resource for health professionals when treating injured musicians. The authors outline a recommended course of action specific to this particular group of performance specialists, as they believe many healthcare professionals to be unfamiliar with how to successfully structure a treatment plan for musicians. Muscle imbalance, poor posture, inadequate physical warm-up and breaks are cited as some of the main causes of injury, as in the Bosi article. This paper cites studies of general music-related injuries as well as instrument-specific injuries to emphasize the relevance of a review of this nature for clinicians in diagnosing musicians of different instruments.

The authors of this paper all have extensive medical backgrounds and knowledge of performing artists. NaYoung Yang has an MD from Rutgers Robert Wood Johnson Medical School as well as significant educational and professional experience as a violinst. Duretti Teferi Fufa and Aviva Wolff work at the Department of Hand and Upper Extremity Surgery at the Hospital for Special Surgery in New York, and Dr. Wolff works frequently with musicians and performing artists, including those at The Juilliard School. This paper gives an in-depth analysis of the specific strains put on different instrument groups as well as some proven strategies for injury prevention and healing from a scientific view, which may support and give context and to commonly used tactics. It may also give some valuable resources for musicians and teachers to support their own health and that of their students.

12. Zaza, Christine, Cathy Charles, and Alicja Muszynski. "The Meaning of Playing-Related Musculoskeletal Disorders to Classical Musicians." *Social Science & Medicine* 47, no. 12 (December 1998): 2013–2023. https://doi.org/10.1016/S0277-9536(98)00307-4.

This paper examines a study conducted to allow musicians to define Performance Related Musculoskeletal disorders as well as the physical, psychological and financial effects they associate with an injury. The collective definition was formed as a question which should be asked to a musician to determine if they have a PRMD; it was based on having pain that interferes with playing one's instrument the way they are used to. Other defining characteristics include long-term, intense, and abnormal pain. As in many of these sources, the musicians cited traumatic psychological and financial effects of PRMDs. One thing that this paper addressed that other sources have not, is the tendency and detrimental effects of musicians trying to treat themselves before seeking professional help. In terms of causes of PRMDs, students more often referred to poor technique, and professionals the absence of warmup as well as workplace tension and workload. Fear was cited as a constant theme throughout the PRMD diagnosis and treatment process. The authors believe that musicians' perspective of their injuries are incredibly valuable in a healthcare environment, because these injuries are often not as well understood by general healthcare professionals. Musicians treated trivially by healthcare professionals will be less likely to seek help, so this may help to reduce stigma associated with PRMDs.

Christine Zaza is faculty at the University of Western Ontario in the Department of Oncology and a member of the London Regional Cancer Institute. Cathy Charles teaches at McMaster University in the Department of Clinical Epidemiology and the Center for Health Economics and Policy Analysis, and Alicja Muszynski teaches in the Department of Sociology at the University of Waterloo.