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An Investigation of the Music Education Reform on Muscular Disease Prevention and Treatment: Case on Piano Teaching Method at Juilliard Music School

Huiqi QUAN[1]

Abstract

The occurrence rate of neuromusculoskeletal diseases related to keyboard instrument performance has remained high among instrumentalists, often limiting or terminating their learning and performing careers. Injured pianists have been eager to find solutions, seeking so-called scientific methods to develop injury-preventing techniques, yet these methods have lacked rigorous research. This study investigates an interdisciplinary and non-traditional piano teaching method - the Juilliard School's Piano Teaching Method - to determine its effectiveness in recovery and prevention of neuromusculoskeletal diseases and relapses. It also examines its influence on technique, musicality, and muscular factors. Participants include undergraduate and graduate students, amateur pianists, and enthusiasts who studied this method for at least two semesters between 2020 and 2022. The sample comprises 103 learners aged 22 to 72, with 74 respondents (N=74) participating (71.8%), and 26 of them underwent in-depth interviews. Survey and interview results indicate that participants find this method significantly beneficial for facilitating recovery from neuromusculoskeletal diseases. Moreover, survey and interview participants report improvements in technique and musicality. This study concludes that the Juilliard School's piano teaching method can serve as a useful model for piano technique instruction aimed at injury prevention within the piano profession, with potential for broader adoption nationwide.

Keywords: keyboard instrument performance; preventive teaching of muscular disorders; teaching method; education; science-based approaches.

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Introduction

Playing the piano is one of the most intricate and multi-faceted psychomotor activities known to humanity. Mastering advanced musical pieces demands not only musical talent and aesthetic sensibility but also delicate and repetitive use of musculoskeletal systems (Jin, 2022).

While the history of piano technique and teaching methods may encompass documented pianists and educators instructing in this art, it is also rife with contradictions, confusion, quasi-scientific theories, and territorial disputes. It can be argued that this confusion, complexity, and contradiction in information correlate with the persistently high injury rates related to playing today (Yang, 2023). The dedication of energy, time, talent, and financial resources can be compared to that of young serious dancers, gymnasts, and figure skaters, who must blend artistic demands with intricate neuromuscular skeletal activities. In fact, the renowned neurologist and performing arts medicine pioneer Wilson stated, "In fact, apart from the fact that there is little difference between a serious musician and a serious athlete, a musician is concerned with perfecting control of the small muscles (or vocal cords) of the upper limbs. Control of the (organ), often immobile during performance and primarily monitored by the auditory system. The difference between artists and athletes is less distinct than it may seem on the surface: the activities of musicians and dancers require a movement component, while the activities of certain athletes encompass artistic elements" (Feng, 1988). For pianists, the rapid repetition of key presses, often several hundred or even thousands of times within a piece, coupled with the unique interactions of numerous small muscles in the arms, hands, and fingers engaged in rapid, repeated movements, alongside the relatively inactive but supportive large muscles of the trunk and legs, adds an additional layer of demand to this already challenging physical activity (Xia, 2019).

In the late 20th and early 21st centuries, some educators claimed to teach biomechanical injury-prevention techniques (Hayashi, 2011). Simultaneously, due to the ongoing challenges in understanding and eliminating performance-related disorders, pianists who have experienced piano-related musculoskeletal syndromes or wish to prevent them often seek answers and effective treatment methods. As demonstrated by this study, their frustrations sometimes worsen due to inaccurate diagnoses and insufficient medical interventions, aimed at aiding pianists' recovery and resumption of their learning or careers. Naturally, in their desperation, pianists frequently turn to these diverse educators, renowned throughout the professional piano community for instructing in injury-prevention techniques, with rumors that their biomechanical models and techniques are effective, even enhancing musical artistry (Shao, 2020).

However, the issue lies in the fact that these injury-prevention techniques and methods have been seldom systematically investigated, l*et al*one reached the

gold standard of randomized controlled trials. Hence, the reliability and efficacy research on these techniques and methods are virtually non-existent. Therefore, the purpose of this study is to systematically examine this particular interdisciplinary method that claims to teach piano techniques for injury prevention (Brazhnik, 2022). Consequently, it seems most feasible to investigate students' perceptions of this method. We chose blended, mixed-methods, qualitative-quantitative design paradigm, combining quantitative surveys intended to produce descriptive and inferential statistics with interviews to yield rich data (Shevchenko, 2019).

The objective of this study is to investigate students' perceptions of an interdisciplinary injury-preventive piano teaching method. This study conducts short- and long-term outcome assessments on adult pianists who have studied this method for two semesters or equivalent time. Pianists with a history of piano-related neuromusculoskeletal disorders (piano-related musculoskeletal syndromes) and pianists without such conditions before training are included in the study. We aim for this study to contribute to an improved understanding of retraining pianists afflicted with piano-related musculoskeletal syndromes and preventing further relapses, and it may potentially reveal methods to instruct piano technique from the outset to prevent performance-related injuries for uninjured pianists. At the very least, this data can serve as a baseline, and this study may model approaches and paths to investigate other injury-preventive piano techniques (Cheng & He, 2022).

This study investigates an interdisciplinary and non-traditional piano teaching method - the Juilliard School's Piano Teaching Method . This method, well-regarded among professionals, lacks systematic research to determine its effectiveness in recovery and prevention of neuro-musculoskeletal disorders and relapses, and its impact on technique, musicality, and muscular factors. Injured pianists pose a global professional challenge. A substantial body of clinical and anecdotal evidence points to consistently high proportions of piano-related musculoskeletal disorders among pianists worldwide. Researchers note that the health issues of musicians have been under-researched compared to those of workers in other occupations involving repetitive motion (Nan, 2022). Perhaps due to historical lag in research, issues have arisen in design, methods, low response rates, non-systematic measurement protocols, lack of statistical analysis, and overall rigor. Similar results were reported by Xue Shi-yi in a 2006 systematic review of piano-related musculoskeletal syndromes in pianists, seven years later (Ying, 2022).

Literature review

In a study conducted in 1996, Zhang Yu attempted to provide scientific support and evidence for the efficacy of the Juilliard School's Piano Teaching Method . This technique is a sensory and psychophysical approach aimed at helping performing artists identifies unnecessary, excessive, or maladaptive movement habits that limit their ability to reach their full potential. In his paper titled "Conscious Use

of the Body in Motion: Peripheral Neuroanatomical Basis of the Juilliard School's Piano Teaching Method ," Zhang Yu delved into a detailed description of the anatomical and neurophysiological aspects of what occurs when an individual experiences the effects of the Juilliard School's piano Teaching Method instruction (Rao, 2020).In the early 21st century, clinical controlled scientific research began focusing on what many considered to be "new age" methods, which have been assisting performing artists for over a century, albeit often anecdotally. In 2003, Ernst and Canter published a systematic review of controlled clinical trials on the Juilliard School's Piano Teaching Method . Their research findings indicated that the technique was effective in reducing and improving pain behavior in patients with back pain. Additionally, a randomized study in 2008 suggested that one-on-one lessons in the Juilliard School's Piano Teaching Method for chronic back pain patients yielded long-term benefits, with the effects of a 6-session course being comparable to a 24-session course. Finally, Ye Zihao and Jiang Yuanyuan conducted a systematic review of the impact of Juilliard School's Piano Teaching Method courses on health and medical conditions, showing strong evidence that the technique was effective for chronic back pain (Yang, 2020).Given the positive findings and results of the past decade, integrating the Juilliard School's Piano Teaching Method into piano skills training programs may demonstrate improvements in overall posture, breathing, balance, mental and auditory acuity, and kinesthetic awareness.

Crappell (2019) investigated injury prevention education among 25 piano students studying at a university in Washington state. Ninety-three percent of the students reported 27 types of piano-related musculoskeletal disorders (piano playing muscle syndrome), but only 7% sought medical care. A survey involved piano players' knowledge of injury prevention, including using good body mechanics, avoiding practice when fatigued, strengthening, adjusting, gradually increasing practice intensity, stretching, gradually progressing in repertoire, reducing stress, paying attention to physical limitations, resting, warming up, and reducing practice during fatigue. Specific issues regarding systematic technique teaching methods were not mentioned (Luo, 2022). Most piano students (62%) reported being taught body mechanics, posture, reducing practice during fatigue, as well as strengthening and adjusting. Despite the high injury rate, pianists believed they had sufficient endurance, weight, and ability to play well. The researchers concluded that a technique course on injury prevention should be added to the curriculum. Ideally, pianists should receive education on principles of healthy playing in their early learning stages (Bremer & Oertel, 2017).

In another study from 2006, the weaknesses of a small sample size and homogenized playing ability levels mentioned in the report further emphasized the reservations expressed by Xiao Huifang and others in 2006. They expressed reservations about studies that were flawed or inconsistent in design. In fact, the concern of Xiao Huifang, among others, about the limited span of piano players' development, teaching, and clinical implications in the research field is unsettling.

Such abnormal findings, although from peer-reviewed journals, made the already challenging research field even more complex and confusing (Noui & Ouamane, 2011).

While improvements were observed in piano playing muscle syndrome and perceived fatigue during the practice process after 10 weeks, only the scores related to perceived fatigue showed a decrease at 6 months, rather than piano playing muscle syndrome (Cicero *et al*., 2011). Therefore, this study presents the following hypotheses:

H1: Piano Teaching Method significantly affects recovery and prevention of performance injuries.

H2: Piano playing muscle syndrome significantly affects recovery and prevention of performance injuries.

Methodology

Operational Definitions

1) Piano Teaching Method: This study employs an experimental research design to investigate the use of the Juilliard School's piano teaching method compared to the use of conventional ones.
2) Piano Playing Muscle Syndrome: This study adopts an experimental research approach to investigate participants with and without piano playing muscle syndrome.
3) Recovery and Prevention of Injuries: This study employs a single-dimensional scale for recovery and prevention of playing-related injuries, based on the framework proposed by Noui and Ouamane (2011).

Research Design

This study employs a combination of questionnaire surveys and in-depth interviews. Convenience sampling is used for face-to-face surveys conducted on-site. In-depth interviews are designed using a semi-structured interview questionnaire, aligned with the research objectives and tailored for different interviewees.

Object of Study

The potential participants in this study range in age from 22 to 72 and represent university students, graduate students, and amateur enthusiasts. The sample includes a balance between pianists who have experienced playing-related musculoskeletal issues before training and those who have never experienced piano playing muscle syndrome. The survey portion of the study is conducted online,

removing environmental considerations. Interviews, however, are conducted in person at one of the teaching halls of Inner Mongolia Art Institute.

In this mixed-methods study, two data collection tools are employed. Besides the preliminary tools for focus groups and experimental research mentioned earlier, the primary means of data collection involve online surveys and face-to-face recorded interviews with participants. These two data collection methods aim to gather comprehensive information, deepen understanding, minimize potential misunderstandings, enhance effectiveness, and ensure more triangulation and clarity of meaning. Interviews were conducted with 26 participants, while 74 current and former students (N=103) of this method responded to the online survey (Yun, 2022).

Method of Analysis

In this study, analysis will be conducted using analysis of variance (ANOVA) to explore the impact of the Juilliard Music School's piano Teaching Method on the effectiveness of preventing and treating muscle-related disorders.

Result and Discussion

Differential Analysis of the Effects of Piano Teaching Method on Recovery and Injury Prevention

This study will utilize analysis of variance (ANOVA) to investigate whether there are differences in the effects of piano teaching method on recovery and injury prevention. As shown in Table 1, it is evident that there is a significant difference between using the Juilliard School's piano teaching method and the general traditional playing method in terms of recovery and injury prevention. Specifically, the use of the Juilliard School's piano teaching method leads to higher levels of recovery and injury prevention compared to the general traditional playing method. Therefore, Hypothesis H1 is supported.

Table 1: Differential Analysis of Juilliard Music School's Piano Teaching Method

Variable Name		F Value	P Value	Scheffe Post Hoc Test
Juilliard Piano Teaching Method	Recovery and Injury Prevention	22.163	0.000**	Juilliard Piano Teaching Method > Traditional General Teaching Method

Represents p<0.05,Represents p<0.01*

Differences in Recovery and Injury Prevention with Regards to Piano Playing Muscle Syndrome

In this study, an analysis of variance (ANOVA) was conducted to explore whether there are differences in recovery and injury prevention associated with piano playing muscle syndrome. As shown in Table 2, significant differences were observed between individuals with piano playing muscle syndrome and those without in terms of recovery and injury prevention. Specifically, individuals with piano playing muscle syndrome exhibited higher levels of recovery and injury prevention compared to those without piano playing muscle syndrome. Therefore, hypothesis H2 is supported.

Table 2: Differential Analysis in Role-Play Scenario Teaching

Variable Name		F Value	P Value	Scheffe Post Hoc Test
Piano Playing Muscle Syndrome	Recovery and Injury Prevention	19.251	0.000**	Individuals with piano playing muscle syndrome>Individuals without piano playing muscle syndrome

Represents p<0.05,Represents p<0.01*

Conclusion

This study draws several conclusions. Firstly, many pianists are skeptical about conventional technique teaching methods due to their historical negative connotations of rigidity and narrowness. These traditional methods are believed to force all students into the same technical mold, sometimes leading to stiffness and injury. Additionally, the unique nature of the piano teaching method , its interdisciplinary, individualized, and holistic approach, which requires hands-on tactile guidance and more than one weekly lesson, sets it apart from mainstream teaching practices. As a result, pianists may feel uncomfortable and somewhat isolated from their colleagues and teachers until the technique starts working for them. Even then, explaining what they are doing to those outside the method can be challenging, potentially leading to the conclusion that the developers of the method have not yet found adequate means to effectively communicate its principles, goals, and strategies. Consequently, students might experience negative consequences in various aspects.

Another significant conclusion is that this method empowers students with cognitive knowledge, analytical skills, and a practical biomechanical model, enabling them to understand risk factors and prevent injury recurrence or, if piano playing muscle syndrome were to recur, to have the knowledge to recover. These tools encompass anatomical and biomechanical knowledge, kinesthetic

awareness and bodily control, fundamental knowledge about how the brain works and neuroplasticity, as well as self-awareness through continuous, conscious reflection and observation. The physical education component in the Julia Music Academy Piano Teaching Method training also contributes to their embodiment of this knowledge. The word "thinking" prominently appears in all NVivo word clouds, indicating a strong emphasis on empowerment through various forms of knowledge; an emphasis on rational, science-based approaches that facilitate more accurate replication of core principles.

The final conclusion is that the method nontraditionally insists on initially separating fundamental technical and sound production from actual music performance in the early stages of training, potentially offering a faster and more effective way to acquire efficient injury-preventive technique. Further research is required in this regard. However, the only drawback is, as repeatedly reported by participants, the method demands a significant amount of discipline, patience, and perseverance, postponing the satisfaction of experiencing music as they retrain their coordination and bodily habits at the piano. For this reason, one can also conclude that since the reward system in the brain plays a crucial role in ensuring sustained motivation, this might not be an effective method for everyone. However, it can also be deduced that pianists afflicted with piano playing muscle syndrome are more motivated to restrain themselves and temporarily step back from musical creation as they yearn to eventually return to a pain-free state of performance.

Suggestions

The leadership within the realm of performing arts medicine should intensify their efforts to establish and promote the fundamental principles of efficacious biomechanics as a means of preventing injuries stemming from piano technique. This initiative should also encompass the identification and communication of associated risk factors. Moreover, it is prudent to employ clear and accessible language to facilitate comprehension within the piano industry.

It is advisable to incorporate a robust curriculum centered on injury prevention techniques within all graduate-level programs focused on piano pedagogy. Currently, this vital aspect is conspicuously absent from the majority of piano education courses. This curriculum should comprehensively address the instruction of injury prevention techniques applicable to both juvenile and adult pianists.

It is incumbent upon autonomous piano teacher organizations to enlighten their membership regarding the prevalence and deleterious repercussions of piano playing muscle syndrome. Furthermore, they should underscore the importance of imparting injury prevention piano techniques within their teaching studios.

Authorities within higher education institutions, particularly those in the musical domain, should acquire proficiency in discerning indicators of neuromusculoskeletal ailments afflicting pianists in the context of their performances, often referred to as piano playing muscle syndrome. These authorities should offer assistance to

affected individuals by facilitating accurate diagnoses and facilitating access to suitable treatments, collaborating with healthcare specialists well-versed in managing such conditions.

Administrators and educators operating within the sphere of higher musical education ought to actively cultivate an environment characterized by awareness and support for pianists who have undergone experiences related to piano playing muscle syndrome. This initiative should encompass instructing music educators, personnel, students, and parents alike, with the aim of fostering a comprehensive understanding of the adverse implications that piano playing muscle syndrome can cast on various facets of a pianist's life, spanning academic, emotional, psychological, and economic dimensions, ultimately impacting their professional trajectory.

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References

Brazhnik, L.V. (2022). Composer Renat Enikeev. In search of a national style (on the example of piano works). *Muzyka. Iskusstvo, Nauka, Praktika*, *2*, 57-66; DOI: 10.48201/22263330_2022_38_57.

Bremer, F., & Oertel, M. (2017). Numerical investigation of wall thickness influence on Piano Key Weir discharge coefficients: A preliminary study. In: Schleiss, A. (ed) *Labyrinth and Piano Key Weirs - A historical review,* 101-108; DOI: 10.1201/9781315169064-14.

Cheng, H., & He, S. (2022). Enlightenment of Chinese Traditional Music Structure to Professional Creation: A Case Study of Piano Arrangement House of Flying Daggers. *OALib*, *9*(4), 1-6; DOI: 10.4236/oalib.1108632.

Cicero, G., Menon, J., Luck, M., Pinchard, T. (2011). Experimental study of side and scale effects on hydraulic performances of a Piano KeyWeir. In: Schleiss, A. (ed) *Labyrinth and Piano Key Weirs - A historical review,* 167-172; DOI: 10.1201/b12349-25.

Crappell, C. (2019). Introduction to *Teaching Piano Pedagogy*. In: Crappell, C. (ed) *Teaching Piano Pedagogy: A Guidebook for Training Effective Teachers*. New York: Oxford Academic; DOI: 10.1093/oso/9780190670528.003.0001.

Hayashi, E. (2011). Automated Piano: Techniques for Accurate Expression of Piano Playing. *Musical Robots and Interactive Multimodal Systems*, *74*, 143-163; DOI: 10.1007/978-3-642-22291-7_9.

Jin, R. (2022). What is Musical Knowledge? Piano Students'Perceptions of Musical Knowledge and Musical Performance in a Chinese Context. *Research and Advances in Education*, *1*(2); DOI: 10.56397/RAE.2022.08.03

Luo, L. (2022). Research on the Method of Cultivating Students' Sense of Music in Piano Teaching in Colleges and Universities. International Journal of Social Science and Education Research, *5*(8), 137-147; DOI: 10.6918/IJOSSER.202208_5(8).0020.

Nan, M.K. (2022). Exploring the use of breath in piano performance. *Journal of Jiangsu Construction Vocational College, 33*, 121- 129.

Noui, A., & Ouamane, A. (2011). Study of optimization of the Piano KeyWeir. In: Schleiss, A. (ed) *Labyrinth and Piano Key Weirs - A historical review,* 175-182; DOI: 10.1201/b12349-27.

Rao, T. (2020). Analysis on the Ideological and Political Construction of Colleges Piano Teaching in the New Era. *Region - Educational Research and Reviews*, *2*(4), 20; DOI: 10.32629/rerr.v2i4.183.

Shao, Y. (2020). The Influence of Psychological Factors on Piano Performance. *International Journal of Social Science and Education Research*, *2*(12), 83-87; DOI: 10.6918/IJOSSER.202001_2(12).0012.

Shevchenko, L. (2019). Style actual principle in performance of the I.S.Bach works to piano art of the Odessa. Almanac Culture and Contemporaneity, *1*, 168-174. DOI: 10.32461/2226-0285.1.2019.180632.

Xia, T. (2019). On the artistic expression in piano performance. *Music Report*, *1*(2), 33-38; DOI: 10.35534/mur.0102006c.

Yang, X. (2020). Research on Auditory Coordination in Piano Performance Teaching. *Arts Studies and Criticism*, 1(3); DOI: 10.32629/asc.v1i3.237Xurong.

Yang, X. (2023). The importance of analysis of piano works in piano performance. *Suihua Journal of Music, 8*, 33-50.

Ying, H. (2022). Analysis of the application of blended teaching mode of piano performance in higher education. *Chinese Literature and Art, 28,* 180-210.

Yun, Y. (2022). The relationship between piano Teaching Method and musical expression. *Music World, 87*, 112-135.