President's Letter

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I hope your summer was restful, with time for planning and thinking about your impact on our profession. One way to develop a foundation for your impact is to connect with others and develop a vision together by learning. Connect. Learn. These are the foci of CSM 2019, which is just around the corner! Please note that CSM will be in January this year. Details can be found at: http://www.apta.org/CSM/

The PASIG has a preconference course! The Performing Arts Special Interest Group and the Academy of Orthopaedic Physical Therapy, APTA will be jointly sponsoring a 2-day course in Washington, DC entitled *"Musculoskeletal Sonography of the Lower Limb Focused in Sport & Performing Arts."* Presenters will include Megan Poll, Doug White, Marika Molnar, and Scott Epsley, who have extensive experience in use of real time ultrasound imagery augmenting the clinical examination in athletes and performing artists. Registration is open!

At CSM, the **PASIG main educational session** will be *"Olympian to Novice: Using Evidenced-based Screening for the Performing Artist,"* presented by Kristen Schuyten, who was the physical therapist who traveled to PyeongChang for the 2018 Olympics with Team USA for Figure Skating.

Stay tuned for updates on PASIG programming, dancer screening, fellowship, and membership in the monthly citation blasts and in our social media leading up to CSM. To belong to our Facebook page, contact Dawn (Muci) Doran, and please tweet about performing arts with us @PT4PERFORMERS.

It is with great pleasure that I introduce Caryn Pierce et al and their research. Thank you all for sharing your study on playing-related musculoskeletal pain in collegiate musicians.

Playing-related Musculoskeletal Pain Among College-level Music Students Before and After an Informative Lecture by a Physical Therapist

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INTRODUCTION

In 2012 the National Association of Schools of Music (NASM) published a new standard requiring accredited schools to provide education regarding musculoskeletal health and safety.[1] This was based on recommendations from the Performing Arts Medicine Association (PAMA) after years of research documented a high prevalence of playing-related musculoskeletal disorders (PRMDs) among student[2] and professional musicians. A systematic review of prevalence studies published from 1980 to 1996 showed that 39% to 87% of musicians reported PRMDs, depending on definition.[3] Little changed until a more recent study where 84% reported playing-related pain at some point in their career, 50% had current pain, and 28% had taken at least one day off in the past season due to pain[4]; other studies noted most musicians' pain lasted > 3 months and some reported prolonged breaks from playing due to pain.[5] Pain was primarily reported in the neck and upper extremities but also in the upper and lower back.[6] It is most common for piano and strings followed by wind and brass instruments.[3,4] Risk factors for PRMDs have been identified. A history of previous upper quadrant injury, small hand size, female gender, increasing age, and subjective measures of stress have been measured and correlated statistically with pianists' playing-related pain.[7] Environmental factors such as lights, seating, ambient temperature, hearing, and use of spectacles are also thought to contribute to playing-related pain as are changes in technique, instrument, or playing time.[8] Heavier instruments or a mismatch between body stature and instrument dimensions may also provide additional challenges, especially in the presence of faulty biomechanics.[9,10] At the time of this study, performance anxiety and sleep disorders had been associated with playing-related pain in musicians,[11,12] but effects of nutrition and fitness had not been assessed. Many musicians have found it difficult to access or navigate health care successfully.[5,13] Education has been shown to be an effective means of prevention and treatment.[14,15] Body awareness and knowing limitations, self-care, yoga, and exercise are topics that have proven valuable to musicians. While interventions such as adding a prevention course to the curriculum,[16] physical therapist-led onsite triage,[17] or customized exercise prescriptions[18] have decreased pain prevalence by as much as 75%, the effect of a single lecture has not been studied. The purpose of this study was to assess the effect of an informative lecture by a physical therapist on playing-related pain among college-level music students. The research hypothesis was that pain prevalence, frequency, duration, intensity, and

related disability would decrease among students who received the education.

METHODS

Researchers obtained Institutional Review Board approval and subjects' informed consent before proceeding with this study. A convenience sample of music students 18 to 50 years of age was recruited from a university music department. Paper surveys were administered during class or rehearsal time in the spring semester, 2 weeks before and 2 ½ months after a 50-minute lecture (Figure 1) delivered by a physical therapist, who was also a violinist. Optional attendance (at the discretion of the music program) was used as a grouping variable in the subsequent analysis. Eighty-one subjects completed pretest surveys; 46 completed both pre- and posttest surveys. Of those who completed both surveys, 11 attended the lecture and 35 did not attend. More than 11 students attended the lecture, but not all of them were study participants. Logistical difficulties related to tight rehearsal/performance schedules and classes not meeting near the end of the semester contributed to the high attrition rate.

The surveys included demographics and two symptom questionnaires–the Standardized Nordic Questionnaire (SNQ) and Musculoskeletal Pain Questionnaire for Musicians (MPQM). Though not useful for clinical diagnosis and treatment, the SNQ and several modified versions have been validated against physical examination for the surveillance of occupational injuries with a sensitivity range of 66% to 100% and specificity of 51% to 88%; it is also highly repeatable > 0.90.[19] The SNQ asks 3 yes/no questions about body parts highlighted on a diagram.[20] The questions were modified (in italics) by the researchers to make it more relevant to this study: have you had trouble (ache, pain, or discomfort) during *fall semester (pretest)? spring semester (posttest)?* has it affected *playing your instrument?* and have you had trouble in the past 7 days? The MPQM, developed from the Chronic Graded Pain Questionnaire (CGPQ) and QuickDASH performing arts module, has been validated specifically for use in musicians with a Cronbach's alpha of 0.768 for internal consistency and overall correlation with the CGPQ of 0.65 ($p < 0.01$). It asks subjects to rate pain frequency, duration, and intensity on a numeric scale and quantifies playing-related disability for a more nuanced description of pain but without reference to body parts.[21] This study attempted to link the two questionnaires by asking subjects to identify up to 3 most troublesome body parts they reported on the SNQ and relate responses on the MPQM to each of those body parts on separate lines. However, most subjects did not clearly indicate which body parts they were referring to on the MPQM. Responses from the first line of the MPQM were analyzed without reference to a specific body part, assuming subjects would likely report their most painful and disabling problem there; other lines were ignored. The total number of troublesome body parts from the SNQ was calculated for each subject.

The SPSS 21.0 was used to analyze the data. Change scores indicating sizes of the pre- to posttest differences were calculated for the MPQM variables. Though raw data were used for analysis, pain prevalence from the SNQ is expressed as percentages in this paper, since groups were of unequal size. Nonparametric Wilcoxon and Mann-Whitney tests were used to make statistical comparisons within and between groups with a significance level set at $\alpha = 0.05$.

FINDINGS

Demographics

Of 46 subjects, 22 were male and 24 were female; sex remained evenly distributed after division into groups. Forty subjects were between the ages of 18 and 25; six were older. Eighteen played violin, 12 piano, 4 cello, and 12 other instruments.

Standardized Nordic Questionnaire

Fall semester pain prevalence for the entire sample ranged from 49% to 54% for the pretest, depending on body part, and did not change significantly on the spring semester posttest (Figure 2). However, when the sample was divided into groups by lecture attendance, a higher prevalence of pain was noted on the pretest among those who chose to attend the lecture (Figure 3), especially when considering reports of symptoms within 7 days of taking the surveys (Figure 4). This difference was statistically significant for upper back pain at 91% for the lecture group and 17% for the no-lecture group ($Z = -3.744$, $p < .001$) as well as lower back pain at 64% and 23%, respectively ($Z = -2.230$, $p = 0.027$). On the posttest, there were significant decreases in upper and lower back pain prevalence among the lecture group—91% to 45% ($Z = -2.000$, $p = 0.046$) for upper back and 64% to 27% ($Z = -2.000$, $p = 0.046$) for lower back. However, the prevalence of upper back pain on the posttest remained higher among those who attended the lecture at 45% compared to 15% among those who did not attend ($Z = -2.108$, $p = 0.035$). There was no significant change in pain prevalence among students who did not attend the lecture. About half of all students who reported pain indicated it affected their playing (Figure 5).

Musculoskeletal Pain Questionnaire for Musicians

Students rated frequency of pain on a scale of 1 to 4 where 1 indicates never, 2 a few performances, 3 most performances, and 4 every performance. On the pretest, those who attended the lecture reported a mean frequency of 2.55 while those who did not attend the lecture reported a frequency of 1.73. This difference was statistically significant ($Z = -1.971$, $p = 0.049$). Frequency decreased from 2.55 on the pretest to 2.09 on the posttest for the lecture group ($Z = -2.236$, $p = 0.025$) but did not change for those who did not attend (Figure 6). Duration of pain was rated on a

"Keeping your Body as Finely Tuned as your Instrument"

Playing-related Pain
- Prevalence and Impact
- Risk Factors
- Posture and Body Mechanics
- Accessing Healthcare
- Personal Responsibility

Prevention is Key!

Figure 1. Lecture outline.

scale of 1 to 4 where 1 indicates minutes, 2 hours, 3 days, 4 all the time. Mean duration on the pretest was 1.73 for the lecture group and 1.61 for those who did not attend. This difference was not significant, and there were no changes for either group on the posttest (Figure 6). Pain intensity included ratings for pain now, worst pain, least pain, and average pain on a scale of 1 to 10 where 1 is "not intense at all" and 10 is "as intense as it could be." On the pretest there were significant differences between the lecture and non-lecture groups for pain now—3.55 and 2.22 respectively (Z = -2.059, p = 0.039)—and average pain—4.64 and 2.5 (Z = -2.493, p = 0.013). Worst pain decreased 6.18 to 4.82 on the posttest among those who attended the lecture (Z = -2.354 p = 0.019), and the size of the change, 1.36, was significantly larger than that of the no-lecture group, 0.19 (Z = -2.155 p = 0.031). (Figure 7). Disability included 4 items related to playing music—technique, instrument, quality, and time—rated on a 4-point scale where 0 indicated no difficulty, 1 mild difficulty, 2 moderate difficulty, and 3 severe difficulty as well as an overall disability rating expressed as a percent disability. The pretest difference between groups was significant for quality at 2.27 and 1.69, respectively (Z = -1.986, p = 0.047). None of the pre- to posttest differences were significant, and neither were the change scores, but there was no longer a difference between groups on the posttest (Figure 8).

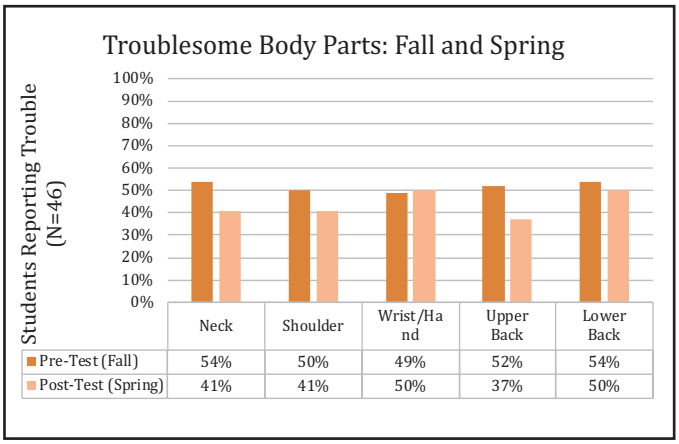


Figure 2. Pain prevalence fall and spring semesters for entire sample.

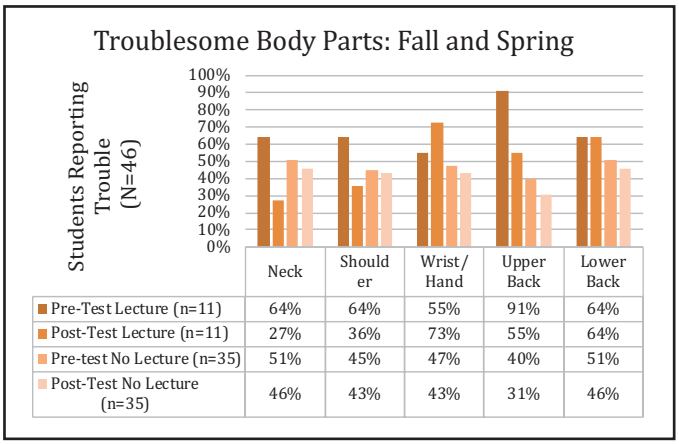


Figure 3. Pain prevalence fall and spring semesters divided into groups by attendance.

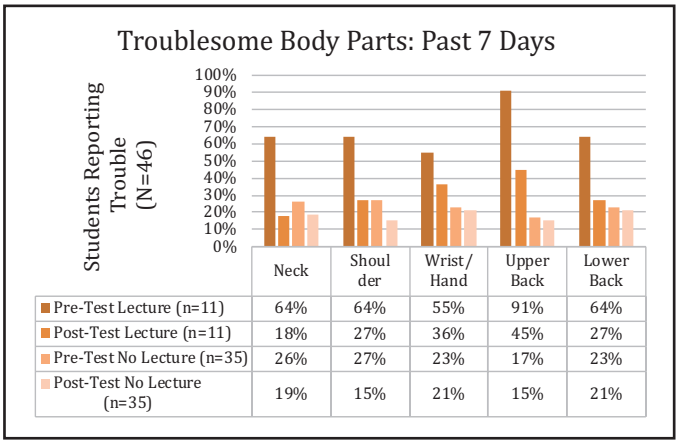


Figure 4. Current pain prevalence, divided into groups by attendance.

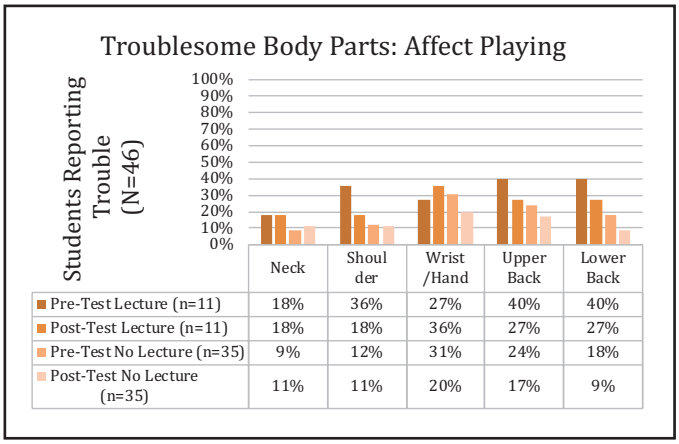


Figure 5. Prevalence of pain affecting playing.

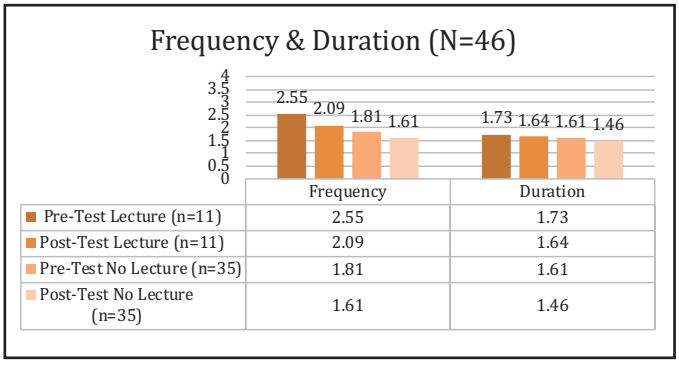


Figure 6. Pain frequency and duration.

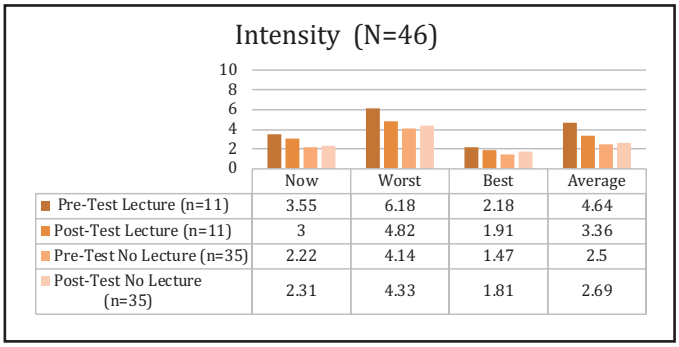


Figure 7. Pain intensity.

Students in the lecture group reported a mean of 3.3 (range 2-6) troublesome body parts on the pretest while the no-lecture group reported a mean of 2.6 (range 0-8) body parts. This was significantly different (Z = -2.027, p = 0.043). The lecture group exhibited a significant decrease in troublesome body parts to 2.09 (range 0-4) on the posttest (Z = -2.21, p = 0.026).

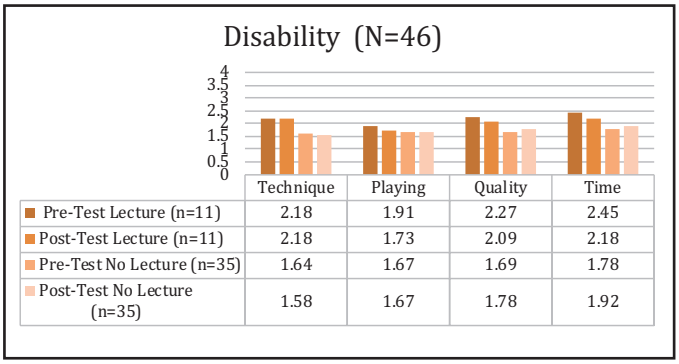
DISCUSSION

This study identified a high pain prevalence among college-level music students as reported in previous studies.[2,3] About half of students who reported pain indicated it affected playing. Understandably, more symptomatic students chose to attend an optional lecture on the topic. Improvements were noted among them after the lecture but not among those who did not attend. This supported the research hypothesis regarding the positive effect of education. Mandatory attendance may have produced a greater effect on the entire music program. However, the fact that it was optional allowed researchers to make comparisons between students who received the education and those who did not.

Alternative explanations for improvements noted in the lecture group include natural regression to the mean and maturation. A significant difference between groups for "worst pain" intensity change scores indicates more improvement than simply a natural regression to mean for this variable. The lack of improvement among students who did not attend the lecture is further indication that symptoms in the lecture group did not just get better on their own. Students may have received other interventions. Students who attended the lecture were instructed how and when to seek professional help; two accessed health care. This was part of the intended effect. Limitations to this study included small sample size, high attrition rate, and self-selection into groups, which potentially allow responses from a few unique individuals to skew results, limiting generalizability. Yet it is more difficult to achieve statistical significance in a low powered study like this, so the lecture most likely had a real effect on students who attended.

To determine clinical importance, effect size was compared with studies validating the CGPQ,[22,23] QuickDASH,[24,25] and Numeric Pain Rating Scale (NPRS)[23] from which MPQM was derived. An effect size of 0.30 to 0.40 or more on an individual item indicates a clinically important change. Changes in pain frequency as well as "worst" and "average" intensity reached the level of clinical importance for the lecture group with effect sizes ranging from 0.51 to 0.66.

The NASM and PAMA published a joint advisory statement for music schools regarding content to be covered in the required health and safety education one year after this study was conducted.[26] The lecture featured in this study was a good match. There are no studies for comparison of the effects of a single informative lecture. However, a 3-credit prevention course added to the curriculum at a conservatory in Spain increased body awareness and decreased injuries 78%.[16] Onsite triage by physical therapists who provided screening, education, and referrals was rated as helpful or very helpful by 79% of musicians who used it.[17] Customized exercise prescriptions decreased pain and perceived exertion among orchestra musicians.[18]



	Technique	Playing	Quality	Time
Pre-Test Lecture (n=11)	2.18	1.91	2.27	2.45
Post-Test Lecture (n=11)	2.18	1.73	2.09	2.18
Pre-Test No Lecture (n=35)	1.64	1.67	1.69	1.78
Post-Test No Lecture (n=35)	1.58	1.67	1.78	1.92

Figure 8. Performance disability—technique, instrument, quality, amount of time.

Clinical Relevance

As movement specialists, physical therapists are uniquely qualified to address PRMDs prevalent among musicians. With increasing emphasis on direct access, cash-based practice, community outreach, and wellness services, the physical therapy profession is poised to engage creatively with performing artists to meet their needs. An informative lecture such as the one featured in this study, could be an effective way for physical therapists to introduce themselves to musicians while helping music schools meet their accreditation requirements.

Future Research

Recommendations for further research include ongoing peer review of materials and methods for education provided by physical therapists in music schools and data collection at multiple sites to determine the effect of this education on pain and disability as well as behavior change. An overall score for the MPQM or similar tool would be helpful in consistent surveillance of PRMDs. Though not specific to musicians, using the DASH or QuickDASH would allow direct comparison with other studies.

CONCLUSION

Some improvements in playing-related pain among symptomatic students who chose to attend an optional lecture by a physical therapist were observed. Although a single lecture may not be enough, this study suggests that education provided by physical therapists may be an effective part of an overall strategy to address PRMDs among college-level music students.

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