Letters to the Editor

Hand Size and PRMDs in Japanese Female Pianists

To the Editor–In their recent paper, Furuya and colleagues (Sep 2006) investigated the prevalence of playing-related musculoskeletal disorders (PRMDs) among Japanese female classical pianists of different age groups.[1] Causal factors were also examined.

The authors state that the 77% prevalence rate for PRMDs among these female Japanese pianists "is a serious problem that needs more medical attention." We agree that this report exposes a serious problem among female Asian pianists. However, the authors report that hand size is not a direct casual factor. Their conclusions about hand size are based on responses to questions asking how hard it is to cover octave keys and self-estimated muscle strength of the upper extremity. Using data from these questions, the authors report that "chi-square tests revealed no significant effect of hand span and muscle strength on PRMD prevalence." We disagree with this conclusion.

First of all, a survey question assessing the perception of difficulty to cover octave keys is not a sufficient measure of hand size. There is no evidence that responses to this question correlate with actual hand sizes. Hand sizes usually are reported from direct measurements of length or span. Many small-handed pianists perform octaves beautifully regardless of hand size, and it is not known how pianists, or any musician group, would respond to questions regarding the level of difficulty to perform. Hand size can be and should be objectively quantified. Similarly, the question of self-estimated muscle strength is not a valid or reliable measure for actual muscle strength.

Secondly, investigations of relationships that imply causation generally require heterogeneity in both the dependent and independent variables of interest. The cohort for this study was exclusively Asian females. Our data on hand size (span), from the Texas Center for Music & Medicine database,[2] show considerable variability. When compared by gender, the hand spans of females are significantly smaller than those of males. Our data also show significant differences between Asian and non-Asian females. When compared by ethnicity and gender, hand spans among Asian females are significantly smaller than those of non-Asian females. Because the sample in Furuya et al.'s study is exclusively Asian females, the hand span variable is likely highly skewed toward small sizes. This limits the potential to fully address the hypothetical relationship between hand size and prevalence of PRMDs.

A follow-up study that includes males and non-Asian females may reveal that the critical differentiating characteristic of this population is, in fact, hand span. Small hand span is a relevant and decisively important characteristic of Asian female pianists and may represent the most important factor for explaining the high prevalence rates for PRMDs reported in this study.

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1. Furuya S, Nakahara H, Aoki T, Kinoshita H: Prevalence and causal factors of playing-related musculoskeletal disorders of the upper extremity and trunk among Japanese pianists and piano students. Med Probl Perform Art 2006; 21(3):112-117.
2. The Texas Center for Music & Medicine has a database of upper-extremity anthropometric measurements for over 500 musicians.

In reply–We thank the authors for their comments on our study. The commentators disagree with our conclusions that hand-span and muscle strength are not the causal factors of PRMDs among 203 active Japanese female pianists, including piano students.

For simplicity, we would like to respond to the second comment (our use of a homogeneous population) first. As we clearly stated in the purpose of the study, the Methods, Discussion, and Conclusions (in many places), our findings were based solely on the population of active Japanese female pianists. The external validity (population validity) of our findings therefore will or should not go beyond this population, unless they share very similar physical structures (possibly Chinese, Korean, etc.). As the commentators mention, the conclusion might change if we were to include other racial groups and males who have apparently larger physiques, but then the interaction with other confounding factors (e.g., strength, playing habits, etc.) would pose some difficulty for analysis. Nevertheless, we fully agree that it would be a very interesting cross-cultural study.

As for the first point, we admit that our explanation for assessment of hand span was insufficient, which has caused some misunderstanding. The idea of using the self-judged hand span based on the perceived difficulty to cover octave keys came from a previous short test performed at our lab. This test included the actual measurement of the hand span (the distance between the tips of the thumb and little finger), hand width, and finger length in 60 piano students, together with a questionnaire that included the perceived difficulty of covering the octave. We found that in pianists, the personal judgment of difficulty to cover octave keys is relatively accurately related to their actual hand size. This seems to be very natural knowledge that it is the pianists' everyday experience.

Our previous test revealed that female pianists with a hand span <18.0 ± 0.5 mm (mean ± SD; range, 17.0 to 18.7 mm)

reported great difficulty covering octave keys. Those having a hand span <19.4 ± 0.8 mm (range, 18.0 to 21.1 mm) reported little difficulty, and those with hand spans <20.1 ± 0.6 mm (range, 19.2 to 21.2 mm) reported no difficulty. Pianists with a hand span 21.0 ± 0.7 mm (range, 19.9 to 22.7 mm) indicated that they can easily cover octave plus extra key(s). Concerning self-judged muscular strength, most high-school and university students in Japan go through a annual battery of physical fitness tests that include grip strength, pull-up strength, trunk extension strength, and so on. Thus, all students typically know their strength level relative to the national standard. As for professional pianists, this annual testing does not occur, and so their estimation may be less accurate.

The result that hand span did not differentiate the group with PRMDs from those with no PRMDs was also surprising to us, which we clearly mentioned in the Discussion. We therefore looked carefully at the distribution for each of the hand size categories. We believed that the hand sizes of the pianists in the groups reporting great difficulty and no difficulty could be separated relatively safely. Therefore, we used only these data for another statistical test, and we found the same result (no group difference).

We hope that these explanations will help readers to better understand our results and conclusion.

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A new feature has been created, entitled "A Day in the Life of . . . ," and the goal is to give an idea of the various stresses, particularly physical and psychological, that may be involved with an artist's line of work. Any strategies you have developed to deal with these problems or prevent problems from occurring also would be of interest to the readers. This helps us as health care providers to be better able to meet the needs of all working artists.

The article should be about 400–500 words in length and can include photographs that illustrate your working postures or conditions. Please also include a brief bio.

For further information, please contact: Bronwen Ackermann, PT, PhD, ackermann@netspeed.com.au.