The Piano Magazine

# Clavier Companion

September/October 2015

# Which size fits you best?

The Piano Magazine
Clavier Companion
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features

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# A slam dunk

**I can't dunk a basketball.** Let's be honest—I can't even get close to the rim of a regulation height (ten foot) hoop. I'm not much of a basketball player to begin with, so this doesn't bother me too much, but it sure would be fun to be able to "throw one down" like a professional.

I may be rationalizing here, but I'm pretty sure that no matter how much I practiced, worked out, did exercises, and tried to improve, I would never be able to dunk a basketball. I don't have the body type for it (translation: I'm not very tall). I could certainly work to improve my vertical jump, which might currently clear a modest phone book, but even a tripling of my current jump would leave me a long way from executing a respectable monster jam.

In high school, I often played pickup basketball with some friends, none of whom could dunk either. Our small town wasn't exactly a breeding ground for future NBAers. We did have fun, however, when we went to the elementary school gym and played using their eight-foot baskets. We could dunk, and it made us feel like "real" basketball players!

I don't worry too much about my lack of dunking prowess, and I don't take it personally. I don't have the natural height or athleticism of a LeBron James, but I do have other, non-basketball related talents. I can play the piano (not as well as I would like, but practice will help), and I love teaching others how to enjoy making music on this wonderful instrument.

I may not be tall, but I can reach a tenth. Comfortably. I've never had to roll the opening of the Gershwin Second Prelude, and I've never done anything special to achieve this span. No extra stretching exercises, workouts, or mechanical aids. I'm fortunate enough to have a hand that naturally covers a large span.

As you'll read in this issue's feature article, much of the piano playing population cannot reach tenths, ninths, or in some cases even octaves comfortably. On modern instruments this can cause real struggle, frustration, and injury. And just like my dunking abilities, there is nothing these pianists can do to "increase" their hand span. Misguided attempts to circumvent mother nature and stretch a hand beyond its normal capacities are not going to end well.

As a teacher, even one who can reach a tenth, it is important for me to remember what it feels like for students who have smaller hands. It is important for me to do everything I can to help all of my students play with natural comfort and ease, and I should take care to avoid putting undue stress on their playing mechanisms. It is my job to help students improve the things they *can* change with practice, and I need to be sure that I don't (perhaps unknowingly) try to send the message that a smaller hand is a deficiency or fault of a student. I can't make a student with a smaller hand reach farther any more than I can make myself dunk a basketball.

You might think that my dunking analogy isn't quite fair—not an apples-to-apples comparison to playing the piano. And you might be right. Basketball is a sport, predicated on athletic ability that naturally relates to body type. I don't think piano playing is a sport, and I don't think it should have anything to do with body type. I make the comparison, however, to remind us that not every *body* can do everything, and it isn't always as simple as more work or more practice.

I'm excited about the opportunities that smaller-sized keyboards present for our profession and for the musical world. I'm excited about the opportunities these keyboard create to help pianists play comfortably and avoid injury. I'm excited about the practice applications and the fact that these keyboards can help pianists direct more focus to tone and artistry.

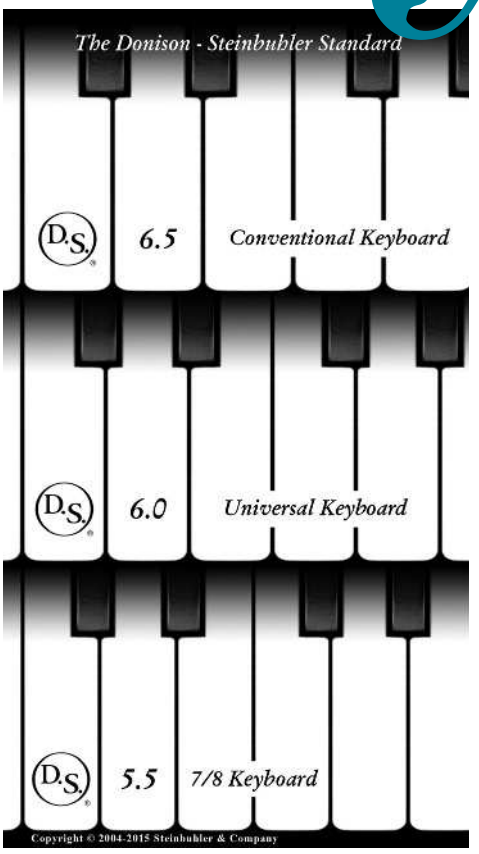
Everyone should have the opportunity to play the piano, and everyone should be able to play it beautifully and artistically. The only thing that matters is the quality of the sound that is produced. Pianists are constantly refingering passages and redistributing notes between hands to improve the sounds they create. If this is OK, then why not resize the keys to help pianists with smaller hands? If this results in more beautiful piano playing in the world, then I am all for it. ▲

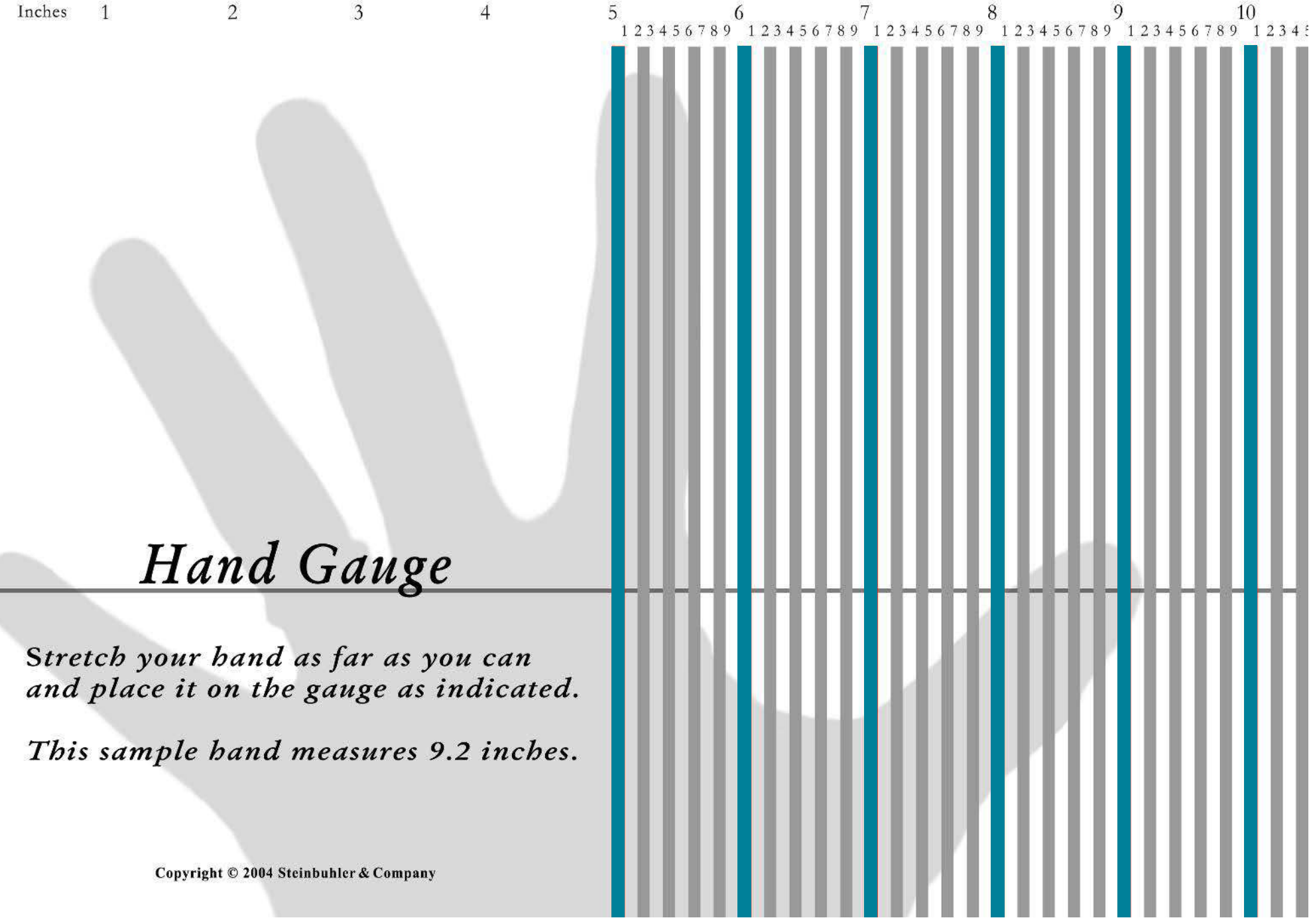
# Size is key

by Carol Leone

**We expect so much in our lives to be tailor made to fit our individual sizes and needs.** This morning, we got up, put on well-fitting clothes and shoes, and popped on our prescription glasses or contacts. We got into our cars and adjusted our seats, steering wheels, rear view mirrors, and seat belts. If you golf, you are fitted with properly sized clubs to optimize your performance. A ballerina has hundreds of sizes and shapes of pointe shoes to choose from. Think of how particular pianists are about the height of adjustable piano benches. Why then, do we persist in the idea that the piano keyboard be "one size fits all"?

Consider the different shapes and sizes of everyone across the globe who plays the piano: children, adults, males, females, university students, amateurs, teachers, professionals, aging pianists, etc. What percentage do you think have hand spans that are ergonomically suited to the conventional keyboard? Handspan studies reveal that it is a small percentage indeed. Wellness research repeatedly shows us that the healthiest hands are those that remain close to a person's anatomically neutral position when playing the piano. However, that size can range widely by several inches from person to person.






# *Hand Gauge*

***Stretch your hand as far as you can and place it on the gauge as indicated.***

***This sample hand measures 9.2 inches.***

## New sizes

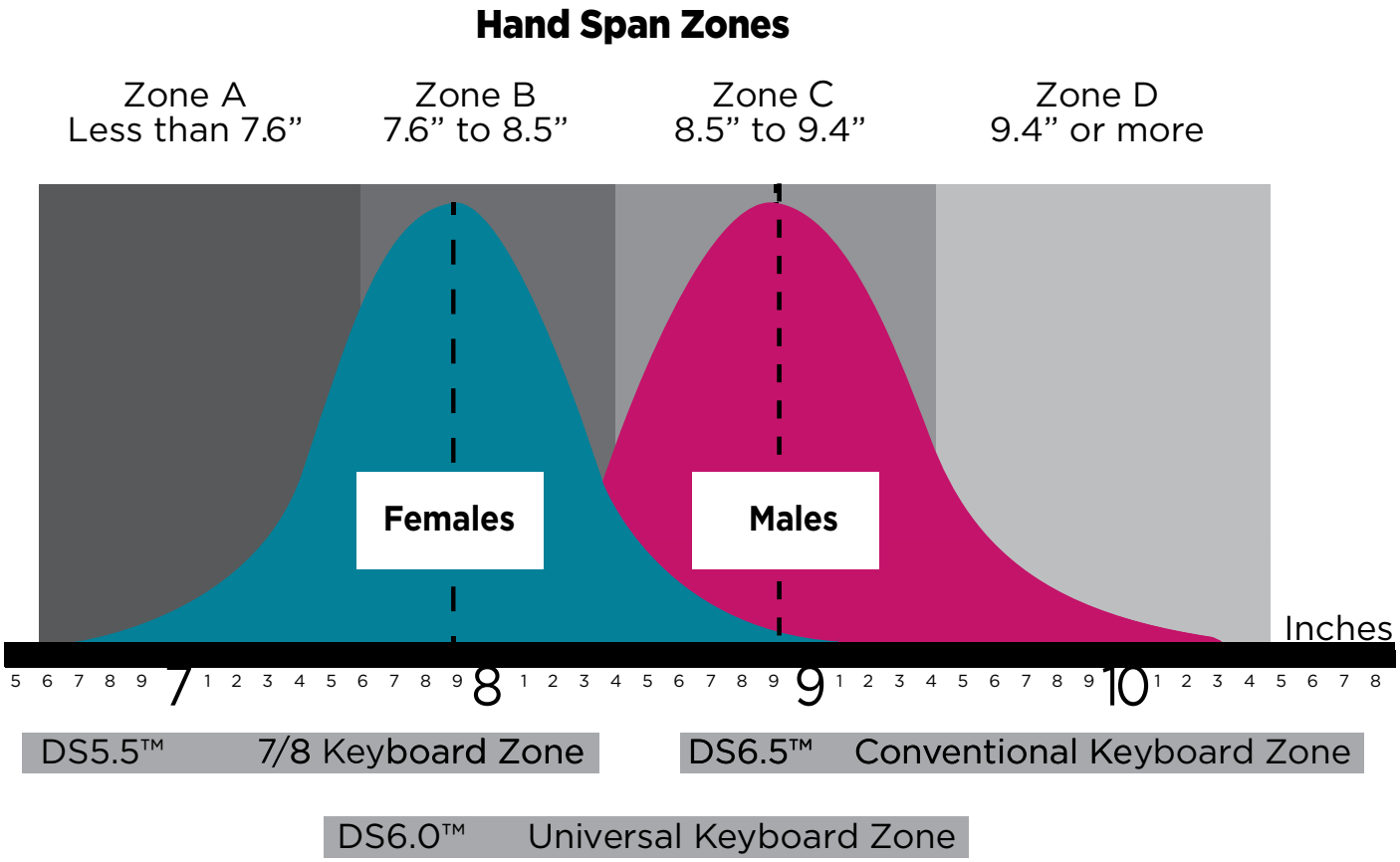
This article describes the importance and recent rise of the use of piano keyboards with narrower keys for acoustic pianos, called ergonomically scaled piano keyboards (ESPKs). The size of these keyboards is measured by the DS Standard™, or the Donison-Steinbuhler Standard. These established and trademarked standards include Conventional (DS6.5™), the Universal (DS6.0™), and the 7/8 (DS5.5™). More than two decades of research by Steinbuhler and Company and other hand span researchers led the company to determine these appropriate standards, which comfortably fit large, medium, and small hand spans.

These keyboards' actions are built to custom fit any size and make of grand piano and can be installed by any technician. The keyboard actions easily come out of the instrument in a self-contained unit and can also be quickly interchanged with the original action by the owner. The action comprises the keyboard itself and the action stack, which includes the hammers and the mechanisms that move the hammers.

## Challenges of convention

Millions of children studying piano across the globe are playing piano keyboards that do not fit their hands. Can you or your students relate to any of these challenges?

- We have to work physically harder at the piano to achieve the same musical result as pianists with large hand spans.
- We are denied the joy of playing certain large-handed repertoire well, or even at all.
- We have to work longer at mastering certain passages, in particular those with large chords and octaves.
- We are rarely considered to be pianist with a "big sound."
- We are more susceptible to pain and injury. Injuries related to playing the piano are at an all-time high, with studies showing that nearly three quarters of those injuries are related to playing large chords and octaves.



# Size is key

Students learning on a keyboard that is too large are disadvantaged in developing a proper hand position and a natural, relaxed approach to the keyboard. In contrast, it is considered sound pedagogical practice to give young string players smaller instruments. Using conventional keyboards, careers of older pianists are often shortened, and their enjoyment is greatly reduced. Besides the possible onset of arthritis or rheumatism, tendons naturally stiffen with age and many hours of practice can no longer be as easily tolerated.

There are direct mechanical disadvantages to playing the conventional keyboard size with a small hand span. These include

- A raised wrist position, resulting in fingers 1 and 5 becoming "pokers," rather than supple conduits of arm weight.
- Excessive lateral hand movement in which the fingers and hand have to travel farther on wider keys, resulting in stiffer fingers and slower motion.
- Percussive strokes from jumping laterally from place to place, rather than fingers being able to play from a starting position close to the keys.
- Excessive forward and backward motion (as in chromatic octaves, when a hand must play on the front edges of the keys to span an octave).[1]

As a piano professor at a university that uses ergonomic keyboards, I often witness pianists place their hands for the first time onto a keyboard that better fits their hand spans. Frequently, pianists will spontaneously burst into tears. A lifetime of struggling with a seemingly insurmountable problem vanishes in the moment they realize, "I am not the problem; it is the keyboard!" The joy of possibility overwhelms them.

## Hand span research

The conventional keyboard of today has a 6.5-inch octave. Hand span researchers Boyle, Boyle, and Booker[2] have concluded that the majority of children, adult females, and a percentage of adult males are best suited to smaller keyboards. Their research has shown that

- The average adult male has an 8.9-inch span and the average adult female's is 7.9 inches (measuring with a flat, fully extended hand from the outside of the thumb and fifth finger).

- In relation to playing the conventional piano keyboard, they have defined small hands as being those whose thumb to fifth finger (1-5) spans *less than 8.5 inches.*

Based on their analysis of hand span data collected from more than 450 pianists, these researchers conclude that the conventional piano keys are too wide for 87% of female adults and 24% of male adults!

The specific octave widths of the DS5.5™ and DS6.0™ that I advocate are 5.54 and 6.0 inches, respectively. These sizes allow small and medium hand spans to remain closest to an ideal neutral playing position and allow for the playing of tenths. The keyboard an individual chooses would depend on the repertoire they want to play and the thickness of their fingers in relation to the black keys.

Measure your hand using the hand gauge on page 12, and then look at the chart on the following page to find your zone. The graphs represent the pianists in the study conducted by Boyle, Boyle, and Booker.

Zone A, "Very Small," contains 1% of the males and 29% of the females in the study. Zone B, "Small," contains 23% of the male sample and 59% of the female sample. Zone C, "Large," includes 58% of the males but only 13% of the females. Finally, Zone D, "Very Large," describes 19% of the male sample and 0% of the female sample.

Underneath the chart you can see the recommended keyboards for each zone: The 7/8 Keyboard (5.5 inch octave) is best suited for Zones A and B. The Universal Keyboard (6.0 inch octave) is an ideal fit for Zones B and C. The Conventional Keyboard (6.5 inch octave) works best with Zones C and D, those with large and very large hands. Note that the range of the keyboards overlap.

In general, **smaller hand spans** are considered to be those measuring less than 8.5 inches, and pianists in this category are best suited to the 7/8 or Universal Keyboard sizes. **Larger hand spans** measuring 8.5 inches or more are a good fit for both the Universal and Conventional Keyboards.

An additional, yet important measure of hand span can be defined using the stretch from the second to the fifth finger. If the span from fingers 2-5 is less than 6.0 inches, it can be considered a smaller hand span best suited to an ESPK.

For example, if I want to play the chord C-Eb-C on the conventional keyboard, my fingers 2-5 must stretch 13 cm from key center to key center. Unfortunately, my span between those fingers falls just slightly short at 12.5 cm, forcing me to turn my hand in an unnatural position. The following photos illustrate my hand playing this chord on the three keyboards. Note the changes in the position of my fifth finger and how it is prone to injury on the conventional keyboard when I apply force behind it. Quite apart from the injury risk is the physical difficulty and increased mental effort in leaping quickly to a chord where one or more fingers are stretched awkwardly.

Conventional 6.5-inch Keyboard

DS6.0™ Universal Keyboard

DS5.5™ 7/8 Keyboard

## A case study

Southern Methodist University's Meadows School of the Arts in Dallas, Texas, where I chair the Keyboard Department, has been a center of research and performance for ESPKs since 2000. I began a case study on the effects of using an ESPK soon after receiving our first keyboard, which we had installed in an existing Steinway B. The results were published in *American Music Teacher* in 2003.[3] My study asked, "How can one adapt to the size?" and "What about going back and forth between the two sizes?" I found that the majority of pianists adjust very easily to the keyboards, and it generally takes less than an hour of practice to feel comfortable. Furthermore, my students and I are comfortable moving easily back and forth among the three keyboards, even within the same recital. During a four-day period in 2014, I successfully recorded a CD recital program using one Steinway D and its three different keyboards (the conventional, the DS5.5™, and the DS6.0™). It allowed me to include repertoire of all periods, including "stretchy" pieces (such as Chopin's Ballade in G Minor) that I would normally avoid programming.

## How does an ESPK feel?

The quietness of the hand and its compactness contribute in a significant way to feelings of comfort, relaxation, security, and more intimacy with the instrument. "I experienced less fatigue and strain on my hands and arms," one student reported. The right ESPK also contributes

significantly to technical ease. An anatomically neutral hand position allows smaller, more refined movements. Fingerings marked by composers and editors finally make sense. Rolled chords and contrived pedaling to mask notes that are not being held manually are eliminated. The high and low ranges are closer to the body; one does not have to lean as far to the right and left. Other students reported: "I feel a whole new technique for this keyboard. I can get deep into the keys" and "My hand looks so natural—I now have a high, strong bridge."

Perhaps the most noticeable musical improvement one is able to achieve on an ESPK is a beautiful *legato.* The pianist also has more power, since a more compact hand is able to deliver more force, weight, and speed than an extended hand. A compact hand more easily achieves proper textures, voicing chords with better results than an extended hand with outstretched fingers. Finally, it follows that with greater technical ease and more efficient motion, one can play fast passages with more velocity.

Piano teachers have to be very clever in devising small-hand technical strategies for their students, and this is time consuming. ESPKs provide several timesaving improvements. Because chords and figurations lie easily under the hand, sight-reading is improved, and the process of note learning and memorization is accelerated. The practice time required to master the technical aspects of a piece is decreased, leaving more time for musicianship and other repertoire.

**Side view of hand on Conventional Keyboard.**

**Side view of hand on DS5.5™ 7/8 Keyboard.**

We have found we can practice challenging passages for a longer period of time without tiring. This improved practice capability has resulted in many students choosing to learn their repertoire on the ESPK first before playing it on the conventional keyboard.

**High school students compare hand spans at SMU's Institute for Young Pianists.**

## Preventing injuries

The case for ESPKs becomes more compelling in view of the unhappy fact that pianists commonly injure themselves on keyboards that are too large. These playing-related musculoskeletal disorders (PRMDs) are characterized by numbness, weakness, and pain that affect or disrupt the musicians' ability to perform. A 2002 study by Sakai[4] focused on hand pain caused by overuse among professional pianists. In that study, Sakai found that seventy-four percent of onset pain coincided with playing two specific musical textures requiring the hyperabduction of the thumb and fifth finger: *octave passages* and *chords.*

Though scientific studies proving a decrease in PRMDs with long-term use of ESPKs have yet to be conducted, compelling anecdotal evidence has emerged at our university during the last fifteen years. Three students in particular were allowed to enroll in our graduate programs despite a long history of debilitating PRMDs. All three reported a dramatic reduction of pain and weakness within the first few weeks of switching to the ESPKs for their practice. Without exception, these students recovered from their injuries and ultimately performed successful, pain-free graduate recitals. While the first half of their recitals were performed on the conventional keyboard playing Baroque and Classical repertoire, they performed the second half on the same piano with an ESPK action, playing repertoire containing octave passages and large chords by composers such as Chopin, Rachmaninoff, and Ginastera.

## Philosophical concerns

Breaking with tradition of the conventional twentieth-century keyboard strikes at the heart of several philosophical and modern societal concerns and benefits, namely: personal integrity, human well-being, diversity, self-realization, choice, and flexibility.

For me, musical integrity is more important than fitting into any outmoded convention. Knowing that my personal musical outcomes have improved significantly with the proper sized instrument, I have easily withstood criticism from those who disagree with this idea or even regard it with derision. Those who choose this option can be proud and dignified

in the face of disapproval. Know that you are in the good company of those who use and used keyboards with alternate key sizes: Beethoven, Liszt, Josef Hoffman, and Daniel Barenboim,[5] to name a few! (Barenboim's newly unveiled piano, the Barenboim-Maene Concert Grand, sports a narrower octave of slightly over six inches.)

Does the current conventional keyboard, designed for the fortunate few, represent a natural selection process? As one colleague argued, "There are already too many good pianists in the world." My response would be, "Why not more art, more beauty? Let's have millions of pianists in the world making more beautiful music." The fulfillment of one's own potential is a central ideal for our modern society. When our society has the means and technology to provide instruments for optimum performance, those technologies and advantages will naturally be sought out, regardless of the tyranny of tradition.

The International Ergonomics Association (IEA) defines ergonomics as "optimizing human well-being and overall system performance."[6] Alternatively sized keyboards place human well-being in its rightful position, above the instrument itself. The IEA explains, "Ergonomics makes things usable to all people, taking into account age, gender, and cultural background." The average female hand span is more than a half inch smaller than the minimum span believed to be ergonomically suited to the conventional piano keyboard. Gender and diversity were not taken into proper account when this standard was established over 100 years ago. The time is now overdue.

In the eighteenth and nineteenth centuries, keyboard sizes were variable and pianists exercised their adaptability and flexibility. Because of mass industry production, twentieth-century keyboards became standardized. The close links between certain European male virtuosos and the major piano manufacturers in the late nineteenth century undoubtedly influenced keyboard size, which is designed to fit the largest hands, not the average. Today's pianists should be encouraged to embrace the beauty and freedom of flexibility. Those who move easily from one keyboard size to another recognize the value of this skill to the understanding of overall piano technique.

## A vision for the future

Why hold the keyboard size a constant in the twenty-first century? A recent study of university piano majors revealed that almost 75% of those surveyed wished for larger hands.[7] If manufacturers regularly produced alternatively sized keyboards, and if they were readily available in performance venues, might you use the keyboards and would you have your students use them? Pianists all over the globe are now seeking to adopt this new paradigm. The organization PASK (Pianists for Alternatively Sized Keyboards) is leading an international movement committed to "achieving change in relation to piano keyboard size. Specifically, PASK seeks to convince piano manufacturers to begin producing pianos with narrower keys (specifically, two additional standard sizes—DS5.5™ and DS6.0™) and to convince managers of concert venues, academics, piano teachers, and piano competition organizers that these ergonomically scaled piano keyboards have significant benefits for students and performers."[8]

Significant progress has been made. Ten universities in the U.S. are now using pianos with ESPKs for teaching, performing, or research. Two international piano competitions allow competitors to compete on ESPKs. Both will occur again in March of 2016: the *Dallas International Piano Competition* and the *Valery Kuleshov International Piano Competition* in Oklahoma. On the exam front in Australia, the New South Wales branch of the Australian Music Examinations Board (AMEB) stated that they had no objection to the use of piano keyboards of different sizes for examinations.

Custom ESPKs for any make and model of piano are available from Steinbuhler & Co in Pennsylvania. Steinbuhler keyboards can also be purchased in a Charles Walter piano. A grand piano with ESPK can be specially ordered from Kawai Australia. Narrower keyboards can be obtained from Laukhuff Keyboards in Germany and the Chris Maene Workshop in Belgium. Current research is ongoing on a number of fronts.

## Incorporating an ESPK into your studio

An ideal teaching model for the home or university studio is to have two pianos in the studio, one with the conventional keyboard and one with an ESPK. The student has lessons in the studio on both, with specific repertoire for each piano and the same technique assignments on both. Technique work with increased challenges (such as octaves and large chords) can be added for work on the ESPK.

In a university setting, the student should have easy access to either one or both alternative sizes for their practice, but for the young student, a

possible scenario is to have an ESPK at home and a conventional piano at school or church. In the longer term, particularly as lower cost uprights and digital pianos come onto the market, we hope that ESPKs will be widely available across the globe.

## Get involved

Check out the many online resources available to you, starting with *Pianists for Alternatively Sized Keyboards*. Attend a conference or visit a university where ESPKs are available for you to try. Talk to your colleagues about the need for change. Assure piano retailers and manufacturers that there is a ready market for both acoustic and digital pianos with ESPKs. Seek to purchase an upright with an ESPK, an alternate ESPK action for your grand piano, or simply retrofit your current action with narrower keys. To maintain excellent international standards, request the sizes established by the DS Standard™.

You will find that the costs are not exorbitant. A completely new alternate keyboard action for a grand piano is approximately $11,000. Other

### Online Resources

**Pianists for Alternatively Sized Keyboards**
http://www.paskpiano.org
https://www.facebook.com/pask.piano
**Small Piano Keyboards**
http://www.smallpianokeyboards.org
**Steinbuhler & Co.**
http://www.steinbuhler.com/index.html
**Dallas International Piano Competition**
http://www.dallasipc.org
**Carol Leone**
http://www.carolleone.com
cleone@smu.edu

options for retrofitting a grand piano action cost less. New upright pianos with Steinbuhler keyboards already installed are available from the Walter Piano Company.

Write a grant proposal or run a student concert to raise funds to purchase an ESPK for your school or home studio for the purpose of teaching, playing, or research. Let's make the opportunity to play the piano well open to all, teach our children properly, prevent injuries, expand our repertoire, and realize our own full musical potential! ▲

Notes:

[1] Boyle, R. (2013). The benefits of reduced-size piano keyboards for smaller handed pianists. *Australasian Piano Pedagogy Conference Proceedings.*

[2] Boyle, R. & Booker, E. (2015). Pianist hand spans: Gender and ethnic differences and implications for piano playing. *Australasian Piano Pedagogy Conference Proceedings.*

[3] Leone, C. (2003). Goldilocks had a choice. *American Music Teacher 52* (6), 26-29.

[4] Sakai, N. (2002). Hand pain attributed to overuse among professional pianists: A study of 200 cases. *Medical Problems of Performing Artists 17,* 178-180.

[5] Kimmelman, M. (2008, November 21). A whirlwind named Barenboim. *The New York Times.*

[6] The International Ergonomics Association. http://www.iea.cc.

[7] Son, Y. & Chesky, K. (2014). Awareness and attitude of professional keyboard players towards small size keyboard. Poster presented at the conference of the *Performing Arts Medicine Association.*

[8] Pianists for Alternatively Sized Keyboards. http://www.paskpiano.org.

**Carol Leone** is Chair of Piano Studies and Associate Professor of Piano at SMU Meadows School of the Arts in Dallas, Texas. Dr. Leone is considered the world's leading performer/teacher/lecturer on ergonomically scaled piano keyboards. She has performed and taught throughout the US, Europe and Asia and has been awarded the top prize in piano competitions such as the National Beethoven Sonata Piano competition. Dr. Leone has given lectures on the subject of hand size and ergonomic keyboards internationally and is a member of the Committee on Wellness for the National Conference on Keyboard Pedagogy.