ENHANCING HEALTH AND PERFORMANCE WITH PROPER MUSIC CHAIRS

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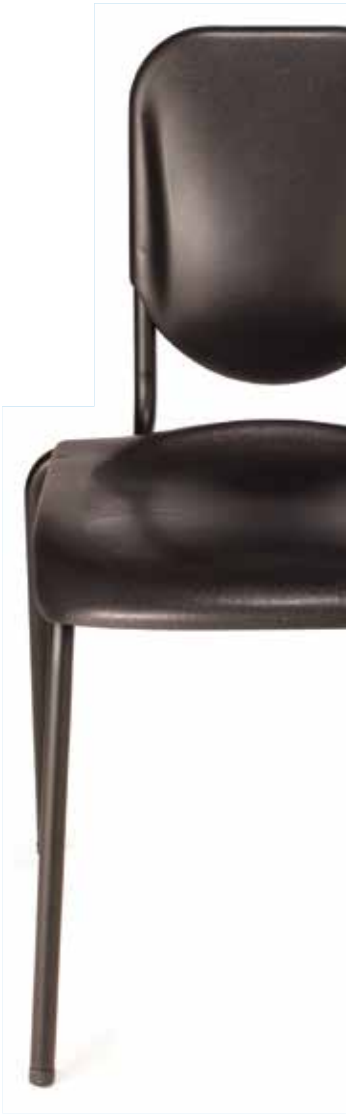


Justifying Investment in Ergonomic Seating for Music

This white paper addresses the importance of specialized music chairs for at least three key reasons:

- Increasing a musician's health and wellness
- Optimizing musical performance
- Improving a musician's ability to focus and classroom management

It's time that the needs of seated musicians merit the same consideration given to computer workstation furniture, where specialized ergonomic task chairs are accepted by many educational facilities as "de facto" standard equipment. In a similar way, every musician deserves a chair designed to support and optimize music performance.

Medical experts and academic research attest to the fact that music-making is strenuous physical activity. Without proper body support and appropriate equipment, musicians can suffer overuse injuries that inhibit learning and diminish performance. The pain and distractions caused by such discomfort can lead to disruptive classroom behavior in younger students. For older musicians, such irritations may discourage or prevent further music participation.

The Every Student Succeeds Act (ESSA) considers music part of a "well-rounded education" in K-12 schools. Chairs are key equipment that enable attentiveness and concentration in the music classroom or performance environment.

Why are proper music chairs important? Whether you're a music director, department chair or administrator, ask yourself these questions:

- How happy and healthy do you want your student musicians to be?
- How well do you want them to play?
- How many do you want to still be playing a year from now?

If your student musicians are sitting on uncomfortable, poor-quality chairs, they are going to be unhappy, playing in pain and playing poorly. Eventually it could predispose them to injury and you might lose them as music students. The right chair helps students fine-tune their instrument to sound the best and perform better.

Importance of Proper Seating

By Nicholas Quarrier of Ithaca College and William Dawson of Northwestern University

Increasing Focus on Student Wellness, School Environment

The overall healthfulness of the educational experience and school environment for students today – of all ages – is carefully monitored, regulated and legislated. For elementary and secondary students, the goal is to promote healthy, well-adjusted children who can fully focus on the learning process and receive maximum benefits from our society's investment in education. If these children later pursue post-secondary education, their objectives will include increased knowledge, focused career/vocational training and further preparation for "real world" responsibilities.

For school facilities and campuses, concerns over violent crime and indoor air quality are just a few issues that make headlines across the country. For student wellness, topics such as nutrition, obesity and physical activity are important concerns of parents, teachers and administrators. The foundation for a healthy lifestyle is established – or undermined – during these formative years.

And there is cause for concern about student wellness. From 2017 to early 2020 the prevalence of obesity among U.S. children and adolescents ages 2-19 years was 19.7%, which equates to 14.7 million youths.[1] The widespread use of computers in classrooms means that students can experience eye discomfort, fatigue, blurred vision, headaches and other eyestrain symptoms. Mental health concerns are also rising among youth. According to the Centers for Disease Control and Prevention (CDC), 42% of high school students surveyed in 2021 reported disengaging from usual activities due to feelings of sadness or hopelessness almost every day for least two consecutive weeks; this is up from 26% in 2009.[2]

Music Students Also Feeling Pain

Although currently out of the media spotlight, the unique aches and pains being suffered by school music students have been recognized in medical studies. A survey at McGill University reported that 35% of student musicians and 56% of professional musicians complained of PRP (playing-related pain).[3] Another study surveyed high-performance young musicians and reported 76% had PRP during and after playing their instrument. Women were more injured, at 79% versus men at 71%. These musicians played their instruments from 7-18 hours per week. The neck and shoulders were injured the most followed by lower back and hands.[4]

Why aren't these injury and pain statistics causing concern? In U.S. schools alone (grades K-12) it's estimated that approximately 24 million students participate in band, choir or orchestra, or 49 percent of total enrollment.[5] In higher education, almost 5,000 music education degrees are awarded annually in the U.S.[6] Why doesn't the subject of pain and injury among student musicians make headlines? One reason may be a lack of appreciation and understanding about the physically demanding aspects of making music.

Playing Music Requires Physical Strength, Dexterity and Endurance

Intense physical and emotional demands are placed on all musicians – whether professionals, amateurs or students. Coordinated physical movements, often performed at a high rate of speed for prolonged periods of time, are required to play a musical instrument. Many instrumental musicians must partially or completely support the weight of an instrument weighing anywhere from 2 to 25 pounds. With certain instruments – such as trombone, strings and percussion – a significant amount of arm motion is also involved. Finger dexterity, fine and gross motor skills and coordination are also required.

Psychological endurance is also necessary, as musicians strive for perfection to please the teacher, conductor, audience, judges or self.

Musicians must often maintain a relatively static, seated position for extended periods of time. Certain instruments require static and awkward positioning, which may contribute to fatigue.

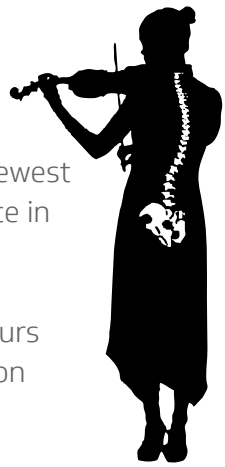
Vocalists and wind instrumentalists must perform rapid diaphragmatic (abdominal) breathing, necessary to move high volumes of air either through vocal cords or an instrument. For wind players, they must maintain the proper facial structure and embouchure (mouth position in relation to the instrument's mouthpiece).

There are many similarities between what the human body is asked to do in sports and in music. Heart rates go up, breathing changes, the body gets ready for the adrenaline response – fight or flight. This is true whether an athlete is running a race or throwing a discus or swimming 100 meters, or a musician is playing an instrument or singing.

All of these physical and emotional demands predispose the musician to postural dysfunctions and overuse injuries.

Proper Posture Crucial for Spine, Respiration

To minimize discomfort and pain, thereby maximizing musicianship potential, the position of the spinal column and respiratory system are crucial:



Spinal Column In the normal standing posture, the spinal column forms what is called a natural sacro-lumbar curve (see illustration). When this happens, the organs and upper body weight supported by the spine are in balance. This state of balance means the fewest possible muscles are required to maintain this position, freeing up muscles to fully participate in the music-making process.

This position permits the diaphragm to function freely and releases muscle tension that occurs when the body weight carried by the spinal column is out of balance. An unbalanced condition results in excessive muscle tension in the back, neck and spine.

Respiratory System Efficient air movement is necessary for playing a wind instrument or singing. In a standing position, the rib cage is freely able to move: air can come out of the lungs at whatever rate is necessary for proper playing or singing.

When a musician is sitting, any limitations to the movement of the torso, or any posture that interferes with the normal expansion and contraction of the lungs, will compromise both airflow and sound production.

Consider Chair as Extension of Musician, Instrument

Standing is considered by many to be the "ideal" posture for music-making, because of how the spinal column and respiratory system are positioned for optimal performance. At music schools, it's not unusual for students to practice and perform recitals while standing. However, large-group rehearsals and performances are commonly held sitting down. Musicians in professional ensembles primarily rehearse and perform while seated.

In most educational environments, sitting is the only position practical for day-to-day student rehearsals and performances. Since most musicians spend the majority of their practice and performance time in the seated position, the chair becomes a crucial piece of equipment – an extension of the musician and their instrument.

A study looked at the relationship of erect sitting and slump sitting in adolescents while they used their smart phones. The sample was divided in subjects with low back pain and no low back pain. Results reported that slump sitting caused increased thoracic and lumbar kyphosis (rounding of the spine) and produced increased back pain after even just 30 minutes of sitting.[7] A study that compared erect sitting and natural sitting found that natural sitting (slumped) compromised the thoracic and lumbar spines while erect sitting reduced it.[8] Slump sitting also increases the intervertebral pressures, thus predisposing to injury.[9]

No one questions that athletes need proper equipment, such as helmets, pads and proper footwear, to play – and stay – safe. They function to protect the athletes, while enabling optimal performance. For musicians, their equipment includes the instrument they play and the chair they sit in.

How well (or poorly) a chair supports the musician will determine whether he or she can get the most from their abilities. Elementary and secondary music students must be able to fully concentrate on the music-making process, without the distractions of physical discomfort or fatigue. For music directors, these student preoccupations often manifest themselves as inattentiveness and discipline problems, which rob a musical group of rehearsal time. Fidgeting is negative primarily when it results from discomfort.

Research in traditional classrooms has found that students also move around to maintain their mental focus; motion facilitates – not inhibits – attentiveness and learning.[10,11] Neurologically, this improved focus relates to connections between the inner ear and cerebellum that gather sensory stimuli and coordinate motor activity.

In higher education, proper seating is vital because longer practice, rehearsal and performance periods pose a risk of injury that could discourage ongoing music participation or even jeopardize a potential career.

Freedom of Motion Important to Avoid Muscle Pain

Rigidity or tensed muscles result from sustained muscle contractions, which can lead to ischemic pain. (Ischemia is a lack of oxygen in the tissue.) Without oxygen, muscles become very sore and painful. Musicians who sit very still or rigid in their torso area can easily cause their extremities to become rigid as well. If ischemic pain is ignored, eventually the muscle, tendon or nerve may become inflamed, resulting in an acute or chronic inflammatory condition. To prevent ischemia and inflammation, it's critical to elicit frequent movement in tense or rigid body parts.

Wanted: 'Ideal' Music Posture Chair

The following help-wanted ad could be written about the ideal music posture chair:
Wanted: *Ideal music chair designed to promote proper alignment of spinal column, eliminating long-term sitting discomfort while providing the necessary freedom for the diaphragm and accessory respiratory muscles to endure the demands of rapid breathing. This chair should also promote a natural freedom of movement necessary for the upper body, arms and hands to properly support and manipulate an instrument. It should also allow a degree of body movement for all extremities, both to help prevent prolonged muscle contractions that can lead to ischemic pain and to help promote attentiveness. The chair should support proper positioning of the feet and legs, so that sitting comfortably does not require the feet to maintain the body's position.*

Enhancing Health and Performance with Proper Music Chairs: The Evolution of a Solution

By Andrew Forsberg, Wenger Corporation

First 'Music Posture Chair' Introduced

Founded in 1946, Wenger Corporation introduced the first music posture chair in 1978. This chair was a logical addition to its line of music education equipment and furniture. This chair was designed to address the posture needs of musicians. When musicians were seated on it properly – positioned all the way back in the seat – this chair helped musicians enjoy standing-position benefits. The hips were placed slightly forward, putting the spine in its strongest, most naturally comfortable position. The rib cage was raised as if in standing position, giving the diaphragm unrestricted movement. It was difficult for musicians to slouch and easy for them to concentrate on mechanics and performance.

However, when musicians were seated at the front, in a "perched" position, the posture benefits of this chair were significantly diminished.

Searching for 'A Better Mousetrap'

The study of ergonomics and its application to office furniture and human comfort and performance accelerated in the 1980s and 1990s, related in part to computer usage. The field of performing arts medicine also grew and developed, focused on the unique physical wellness issues of musicians and risks of overuse-type injuries. The Performing Arts Medicine Association was founded in 1989 to "improve health care of the performing artist."

For more than 40 years, Wenger Corporation has learned – through observation in the field and customer research – that more than half of school music directors prefer their students to sit forward in their seat, perched on the front edge of the chair, in part to encourage attentiveness and discourage slouching. There is no medical or ergonomic justification for such a seating position, but it's traditional, particularly for upper string players.

Wenger decided to remedy this situation by developing a multi-position chair that could accommodate both seating preferences while providing important posture benefits.

Wenger research also found that ALL music directors observe their students shifting positions in their chairs throughout rehearsals and performances. This restlessness was attributed, in part, to the "fidget-factor" of active children and adolescents. As noted earlier, students move for a variety of reasons, including to increase mental focus and decrease physical discomfort. Increasing blood flow with frequent movement helps prevent muscle tension and rigidity, reducing the likelihood of painful inflammation.

Nota® Music Posture Chairs Developed

Wenger specifically designed Nota® chairs for optimal comfort, flexibility and proper body support. In addition, the design team also decided that these chairs should strive to accommodate the varied seating demands of different instrumentalists.

Through focus groups and other customer research, Wenger explored a variety of chair options, designs, materials and finishes. Wenger also consulted with medical experts about posture principles and key ergonomic issues related to seating.

At that time, the medical personnel included:

- Dr. Alice Brandfonbrener
  Assistant Professor, Department of Medicine, General Medicine Division Department of Physical Medicine and Rehabilitation Northwestern University's Feinberg School of Medicine, Chicago, Illinois
- Dr. William J. Dawson
  Past President of the Performing Arts Medicine Association; Associate Professor Emeritus of Orthopaedic Surgery, Northwestern University's Feinberg School of Medicine, Chicago, Illinois
- Babette Lightner
  Director, Stones in Water – A Movement Education and Learning Methods Center Educator, River Falls, Wisconsin
- Nicholas Quarrier
  Clinical Associate Professor of Physical Therapy, Ithaca College, Ithaca, New York
- Jonathan Reynolds, PhD, PT
  Co-owner and Founder, Reynolds Rehabilitation Enterprises, Minneapolis, Minnesota

Revolutionary Features of the Nota Chair

From market research and product engineering, the Wenger design team believes the Nota chair has several revolutionary features unavailable in any other music-specific chair:

Position-Transition Seat with Dual Seating Zones

The two distinct seating zones in the Nota chair can accommodate either front- or rear-seating preferences. This provides uncompromising comfort and posture support in each position, and facilitates easy movement between positions.

Narrow Convex Back This uniquely shaped back bows outward toward the seated musician, helping to encourage the natural sacro-lumbar curve of the spine. The convex shape also means that it offers this support even when musicians sit at an angle on the chair. Its narrow shape provides greater freedom of movement, both for the upper arm/torso and rib cage/diaphragm.

Accommodating Angled Seating

Musicians may choose an angled seating position on a chair for a variety of reasons. Those musicians playing certain instruments – such as French horn, violin/viola, flute or larger saxophone – require an angled position to prevent their elbows, or in some cases their instruments, from hitting their chairs. Two musicians who are sharing one music stand may also need to sit slightly sideways in order to see correctly.

The Nota chair, with its rounded front corners and "waterfall" front, accommodates angled seating preferences without uncomfortably constricting the legs. (Chairs with sharply angled front corners restrict angled positioning.)

Proper Leg Support

Proper support for the legs and thighs impacts the circulatory and nervous systems. With chairs that are concave-shaped in the front, the likelihood increases that musicians will complain about numbness, tingling or irritation in their legs because nerves are being compressed. The Nota chair provides proper support and promotes better circulation.

Accommodating Range of Motion

The Nota chair allows the musician's body to be more fluid than regular chairs. With the pelvis tipped slightly forward, the body is more apt to "teeter totter" or sway slightly in different directions. The unique shape of the seat also fosters this motion. By utilizing more muscle activity, it assists in circulation and reduces the likelihood of muscle rigidity caused by sustained contractions.

Other Supportive Chair Attributes

Transition/Movement The transition (middle) area on the seat makes it easy for musicians to move between front (perched) or rear (engaged) positions on the seat, or change their sitting angle.

Spinal Curvature To maintain the spine's natural sacro-lumbar curve, the recessed seat contour of the rear (engaged) position of the seat helps angle the pelvis slightly forward, preventing it from rolling backwards – which happens when people slouch. The recessed seat area offers fewer pressure points by more naturally cradling the body's contours.

Breath/Circulation When the pelvis is slightly forward and the spinal column properly aligned, the rib cage is not compressed, allowing for maximum ventilation and breathing capacity.

Height Accommodation The Nota chair's rounded waterfall front accommodates musicians of different heights more easily than average classroom chairs. In order to help keep the thighs sloping downward, the Nota chair is also higher than average classroom chairs. The 19" Nota chair will be the size best suited for most musicians, but Wenger also offers 14.5", 16", 17.5" and 20.5" models to accommodate musicians throughout the height spectrum.

Professionals, Other Musicians Can Benefit

The benefits of Nota chairs extend far beyond school-age musicians. Professional musicians also struggle with music-related difficulties. More than three-fourths of orchestra musicians in a national survey suffered at least one musculoskeletal problem severe enough to affect performance.[12] The prevalence of injury is due, in part, to the extended playing time professionals must endure in rehearsals and performances.

While the potential for fatigue is greatly increased for professionals, the proper chair can help minimize problems. Musicians who are seated comfortably with the capability for movement will be able to withstand longer playing sessions with a decreased risk of adverse musculoskeletal and respiratory consequences.

By promoting proper posture and good health, the management of professional music organizations can help minimize musician downtime. This proactive approach saves money by reducing the need to hire substitute musicians or pay disability expenses.

Many woodwind players and orchestra pit musicians are "doublers" – playing two or more instruments during a session. The Nota chair enables these musicians to easily and comfortably transition to suit different instruments.

Amateur musicians who play in community bands and similar organizations can also benefit from proper music chairs. The adults in these performing groups, which usually rehearse in schools, will be less likely to experience music-related difficulties.

FEATURES & BENEFITS

Position-Transition Seat

- Promotes good posture in either the forward "perched" or rear "engaged" position
- Contour allows musicians to sit straight or angled on the chair
- Transition area makes it easy to move from an engaged to a perched position

Narrow Convex Back

- Allows for greater freedom of movement
- Provides greater lumbar support
- Allows the musician to sit straight or angled on the chair and still get back support

Rounded Waterfall Front

- Promotes better lower extremity circulation, reduces nerve compression
- Encourages a natural lumbar curve, even in the forward position
- Allows one height of chair to ccommodate a greater variety of body sizes

Comments About the Nota® Chair

Music directors and medical personnel who have experienced Nota chairs firsthand offer strong opinions about their benefits:

"We're very happy with the Nota chairs. My students find the Nota chairs very comfortable, even for longer rehearsals; the chairs just seem to fit their bodies better. Whether students sit back or on the edge, they have great posture."
Anthony H. Bailey, Director of Bands, Hart High School, Santa Clarita, California

"I find the Nota chairs very comfortable – I really like them. As a singer, I prefer to sit on the front of the chair, but sitting against the back is also very comfortable."
Travis Erikson, Choral Director, DeKalb High School, DeKalb, Illinois

"I really like how the Nota chair positions the student correctly for proper posture. The chairs help me reinforce that lesson. These chairs have worked out very well."
Fred Trumpy, Band Director (retired), Bernards High School, Bernardsville, New Jersey

"With the Nota chair, you're not sitting – you're poised for action. It puts you in the exact spot you need to work. You can focus all your energy on your music, rather than fidgeting and trying to get comfortable. I can sit longer and practice more; I also have one for my own practice at home."
Lora Lynn Snow, Founder, Executive Director and Principal Oboist, The Ohio Valley Symphony, Gallipolis, Ohio

"It is critical to have postural alignment for musical performance. This chair supports the ability to sit up in a better alignment – better position. With the contoured seat and the back support it offers, you can sit longer with less fatigue and therefore, less ability to slouch."
Nicholas F. Quarrier, DPT, PT, OCS, Clinical Associate Professor, Department of Physical Therapy (retired), Ithaca College, Ithaca, New York

"A chair like the Nota chair, that allows a musician to sit comfortably and play efficiently and easily, can certainly help musicians maintain their good health."
Dr. William J. Dawson, Past President of the Performing Arts Medicine Association; Associate Professor Emeritus of Orthopaedic Surgery (retired), Northwestern University's Feinberg School of Medicine, Chicago, Illinois

"Good posture is absolutely critical for all musicians to perform and practice at their best. The Nota music posture chair encourages proper center, balance and alignment."
Robert W. Rumbelow, International Conductor / Composer / Educator, Columbus, Georgia

"Once you sit in the Nota chair, it seems like magic. It seems to naturally align your hips – especially for violin. Even when you are sitting back or forward it puts the body in the right alignment. And it's just the right height. I fully support using the Nota chair for myself and my students!"
Susan Waterbury, Professor of Violin (retired), Ithaca College, Ithaca, New York

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