

The following is excerpted from “Basic Information on Neuromusculoskeletal and Vocal Health: Information and Recommendations for Administrators and Faculty in Schools of Music,” published by the National Association of Schools of Music/Performing Arts Medicine Association and reprinted by permission.

Neuromusculoskeletal Issues Affecting the Body

Muscle Pain

Whether one ascribes muscle pain to overuse, misuse, postural factors, tension, technical problems, or poor conditioning, the principal underlying cause of muscle pain is sore muscles.

Muscles that are fatigued are less able to contract as strongly and frequently as “normal” muscles. With continued use, fatigued muscles are placed under greater stress, often leading to microscopic damage and disruption of the muscle fibers, a condition known as muscle strain.

Muscle contraction is a physical-chemical process. When the necessary chemical compounds are in short supply, muscles can no longer operate at optimal efficiency. Furthermore, muscle contraction produces lactic acid; when this substance accumulates in tissues, it minimizes the muscle’s ability to continue efficient contractions.

Both of these consequences of excess muscle use will cause pain during and after the period of use. Once the period of activity is over, some of these side effects will correct themselves. In other instances, muscular pain will continue for variable periods of time.

Playing-related neuromusculoskeletal disorders in all age groups are more commonly seen in specific body locations. Paramount among these are the shoulders, neck, hands/fingers/wrists, and lower back. Some of these locations are more common in specific instruments, e.g., thumb problems in clarinetists, lower back strain and pain in double bass players.

Neuropathies

“Neuropathy” is a general medical term that refers to diseases or malfunctions of the nerves. Neuropathies are classified according to the types or location of the affected nerves.

Focal neuropathy is neuropathy that is restricted to one nerve or group of nerves, or to a particular area of the body. Symptoms usually appear suddenly and can include pain; sensory disturbances, such as numbness, tingling, “pins and needles” sensations, burning, or even itching; and weakness. In the case of bodily extremities, the pain may occur at the site of a nerve compression or entrapment, which occurs when a nerve passes through a narrowed channel bounded by bone, fibrous bands, bulky muscles, or enlarged arteries on its way to or from its ultimate destination.

In other cases, the pain may be distributed anywhere along the course of the nerve. Muscle weakness and impaired dexterity are often later effects.

The three most commonly identified entrapment neuropathies include 1) carpal tunnel syndrome at the wrist, 2) ulnar neuropathy, and 3) thoracic outlet syndrome.

Carpal tunnel syndrome occurs when the median nerve, which runs from the forearm into the palm of the hand, becomes pressed or squeezed at the wrist. The carpal tunnel – a narrow, rigid passageway of ligament and bones at the base of the hand – contains the median nerve and several tendons. When irritated or strained, these tendons may swell and narrow the tunnel, compressing the median nerve. The result can be pain, weakness, or numbness in the hand and wrist that radiates up the arm. Causes are numerous and varied.

Ulnar neuropathy is a condition in which the ulnar nerve, which runs from the neck along the inside edge of the arm and into the hand on the side of the little (pinky) finger, becomes inflamed due to compression of the nerve. Symptoms include tingling, numbness, weakness, and pain, primarily along the elbow, the underside of the forearm, and along the wrist or inside edge of the hand. Compression of the ulnar nerve is often linked to repetitive wrist or elbow movements. For musicians, sustained elbow flexion, particularly among players of bowed instruments, has been known to contribute to this condition in some cases.

Thoracic outlet syndrome is a group of disorders that occur when the blood vessels or nerves in the thoracic outlet – the space between the collarbone and first rib, become compressed. Symptoms include pain in the neck and shoulder areas and numbness in fingers.

Dystonia

Dystonia is defined as a disorder of sustained muscular contractions, producing unwanted movements or abnormal postures. The cause of dystonia remains unclear.

Focal dystonia is dystonia that affects a particular area of the body. Because men are more likely to develop focal dystonia, it is hypothesized that genetic or hormonal factors may be involved. Additionally, repetitive movements, especially those that are painful, seem to trigger it.

In the instrumental musician, dystonia typically presents symptoms that are localized to the upper limb in keyboard, string, percussion, and woodwind players, and that involve the embouchure in brass and some woodwind players.

The right hand of keyboard players and the left hand of string instrumentalists are most commonly affected.

Neuromusculoskeletal Issues Affecting the Voice

The more common neurological voice disorders in the music student include phonatory instability, vocal strain, and vocal fold motion abnormalities.

Phonatory Instability

Phonation is the process by which air pressure generated by the lungs is converted into audible vibrations. A method of phonation called “voicing” occurs when air from the lungs passes along the vocal folds at the base of the larynx, causing them to vibrate. Production of a tonal, pleasant voice with smooth changes in loudness and pitch depends upon the symmetrical shape and movement of the vocal folds.

Phonatory instability occurs when there is asymmetrical or irregular motion of the vocal folds that is superimposed on the vocal fold vibration. Phonatory instability often manifests itself as an unsteadiness, hoarseness, or roughness of voice. The condition can be short- or long-term.

Short-term causes of phonatory instability include fatigue, certain medications, drug use, and anxiety. These problems tend to resolve rapidly with removal of the cause, but remain if the causative agent fails to be eliminated.

Over-the-counter allergy medications, antidepressants, and highly caffeinated drinks, which stimulate the nervous system, can cause vocal tremors, a form of phonatory instability.

Vocal Strain and Vocal Fold Abnormalities

Overuse of the voice, whether by singing or speaking, can produce vocal strain. Unlike playing an instrument, singers must be aware of problems singing at the extremes of vocal range, especially the upper end. Both duration and intensity of singing are as important as they are for instrumentalists.

Misuse activities can occur also; examples of this are attempting repertoire that is beyond the individual’s stage of vocal maturity and development, and improperly learning and practicing certain vocal styles.

Prolonged overuse, in some cases, can lead to the development of nodules on the vocal folds. The nodules appear initially as soft, swollen spots on the vocal folds, but as vocal abuse continues, they transform into callous-like growths. Vocal nodules require specialized and prolonged treatment and rehabilitation and can be of grave consequence to singers.

Basic Protection for All Musicians

On stage and in life, it is important for musicians to take steps to protect their neuromusculoskeletal health. Musicians and music faculty whose playing- and singing-related behaviors make them susceptible to certain neuromusculoskeletal conditions and disorders may wish to explore the following methods of neuromusculoskeletal health protection:

- Warming up before practice and performance. As appropriate, engage in physical, vocal, and musical warm-up exercises. Mobilize muscles and joints in order to increase blood flow to those body parts that will be moving rapidly and frequently during the playing and performing of music. Lubricate your vocal folds.

- Taking a break from practice and rehearsal whenever possible. A good rule of thumb is a 5-minute rest every half hour.
- Avoiding excessive practice time and stress. Set daily limits, and vary repertoire during practice sessions.
- Avoiding excessive repetition of difficult repertoire, especially if progress is slow.
- Avoiding repertoire that is beyond one's technical or physical reach.
- Refraining from sudden increases in practice times. Instead, slightly reduce total practice time before juries, recitals, etc. in order to allow mind and body adequate energy for performance.
- Ensuring proper body alignment and technique. Be mindful of balance and weight delivery, and ensure adequate freedom of movement and support during practice and performance. If appropriate, adapt an instrument or make use of external support mechanisms, such as shoulder rests, neck straps, and flute crutches.
- Maintaining good "mental hygiene." This includes getting adequate sleep, good nutrition, regular exercise, and spending time with friends and family. Refrain from hazardous or recreational drug use. Seek the help of a mental health professional when appropriate.
- Allowing for relaxation. Injuries are much less likely to occur in persons who are both physically and psychologically fit. Stress management is as important as practice management.

Vocal Protection

It is equally important for musicians to take steps to protect their vocal health. This holds true for all musicians, regardless of performance medium or area of specialization. Musicians may wish to explore the following methods of vocal health protection:

- Drinking plenty of water. The vocal folds need to be lubricated with a thin layer of mucus in order to vibrate efficiently. The best lubrication is achieved by drinking plenty of water. Aim to drink at least eight glasses of water a day.
- Avoiding and/or limiting consumption of caffeinated and alcoholic beverages, as they pull water out of your system and deplete the vocal folds of needed lubrication. If you choose to drink caffeine or alcohol, be sure to sufficiently increase your water intake.
- Not smoking. Smoking irritates and dries out the lining of the larynx. It contributes to decreased vocal quality, promotes reflux laryngitis, and increases the need for throat clearing and "smoker's cough." Smoking is also extremely detrimental to lung function, which can make breathing, speaking, and singing more difficult. Also, work to avoid exposure to secondhand smoke.

- Being mindful of antihistamine usage, which dries out the vocal tissues. Be sure to stay well hydrated if you are taking allergy medication. Certain other medications, both prescription and over-the-counter, may have a similar drying effect. When in doubt, check with your doctor and, if appropriate, ask about suitable alternatives.
- Avoiding dry air environments. Forced heat, air conditioners, and climates with low levels of environmental moisture can be hard on your vocal health. Consider using a humidifier at night to compensate for the dryness.
- Avoiding yelling or raising your voice unnecessarily.
- Avoiding throat clearing and voiced coughing.
- Using vocal amplification systems when available and appropriate.
- Resting your voice, especially if you are sick. Remember, it's important to give yourself adequate time to recover.

A Special Consideration – Marching Music

Marching music is an important part of many colleges and universities. It is usually connected with athletic programs and events. The marching musician must not only be able to play an instrument at a high level of skill, but do it while moving along a street or across an athletic field, often at rapid rates and with irregular movement patterns. Additional physical capabilities are necessary for this to be accomplished without danger. Marching musicians require high levels of physical conditioning, strength, and endurance; they must be in good general health and physically fit.

Additionally, training in marching music produces an additional litany of activity-related physical disorders that must be considered in any school's health program. Problems unique to marching music include lower extremity injuries such as sprained ankles, toe contusions, and knee strains. Carrying heavy instruments places a great physical demand on the neck, torso, lower back, and legs. Training usually occurs outside during the summer, sometimes in high heat and high humidity. Sunburn and dehydration can occur all too easily in the absence of preventative measures. Times of rest and rehydration are vital for marching units. Finally, marching units are usually much larger than most indoor ensembles, and their sound levels often exceed recommended levels, especially during long rehearsals.

Basics Music Professionals Need to Know and Be Able to Do

- Understand and share with others the risks inherent in excessive and improper neuromusculoskeletal use while playing and singing music, including the risk of prolonged or permanent damage to musculoskeletal and neurological tissues.
- Recognize that playing and singing music in inappropriate ways or for extended times can cause playing and singing-related neuromusculoskeletal disorders.

- Monitor practice time and intensity, choice of repertoire, and playing and singing techniques to prevent the development of playing- and singing-related disorders.
- Apply health knowledge in specific musical contexts, such as practice, performance, production, education, competition, and listening.