

Abstracts from the Literature

William J. Dawson, M.D.

Emerich KA, Titze IR, Svec JG, Popolo PS, Logan G: Vocal range and intensity in actors: a studio versus stage comparison. *J Voice* 2005;19(1):78–83.

Actors who graduate from a program without knowledge of the vocal mechanism, how to protect the voice from injury, and how to perform vocally demanding tasks safely may put themselves in a vocally compromised position sometime during their acting careers. A voice range profile (VRP) was obtained from eight professional actors (four male, four female) and compared with two speech range profiles. One speech profile was obtained during the dramatic reading of a scene in the laboratory and the other during a performance on stage in a professional theater. The objective was to determine the pitch and loudness ranges used by the actors in speech relative to the VRP—specifically, did the actors stay within the center of the VRP, or did they tend to drift toward the boundaries of intensity and frequency? A second question was whether the performance in the laboratory accurately reflected that of a stage performance. Six of the eight actors were occasionally louder during acting than the limits they had set for themselves in their VRPs, and all four women lowered their pitch below the VRP limits consistently. This result shows that the actors may not be using their voices optimally and often exhibit behaviors that are more consistent with hyperfunction, which could lead to vocal fatigue or potential injury.

Muñoz MT, de la Piedra C, Barrios V, Garrido G, Argente J: Changes in bone density and bone markers in rhythmic gymnasts and ballet dancers: implications for puberty and leptin levels. *Eur J Endocrinol* 2004;151:491–496.

The authors compared physical activity and biochemical markers with bone mineral acquisition in rhythmic gymnasts and ballet dancers. They measured weight, height, body mass index, nutritional intake, bone age, and menstrual histories in 9 rhythmic gymnasts, 12 ballet dancers, and 14 controls. Bone mineral density (BMD) was assessed by x-ray absorptiometry at the lumbar spine, hip, and radius. Bone alkaline phosphatase and other chemical markers were also measured. Bone age was

delayed 2 yrs, and mean age at menarche was 15 ± 0.9 yrs in rhythmic gymnasts and 13.7 ± 1 yrs in ballet dancers, compared with 12.5 ± 1 yrs in controls. Trochanteric and femoral neck BMD was significantly higher in rhythmic gymnasts than ballet dancers and controls. Right forearm BMD was significantly decreased in rhythmic gymnasts and ballet dancers compared with controls. All subjects had normal alkaline phosphatase levels, but serum leptin levels were decreased in both test populations. Rhythmic gymnasts had a positive correlation between right forearm BMD and leptin levels. Estrogen deficiency also may be responsible for low BMD seen in women whose amenorrhea is associated with caloric deficiency, nutritional imbalances, and exercise. The decreased bone mass levels could be implicated in the pubertal delay and may be a good marker of bone mass in these subjects.

Koeneke S, Lutz K, Wüstenberg T, Jäncke L: Long-term training affects cerebellar processing in skilled keyboard players. *NeuroReport* 2004;15(8):1279–1282.

The cerebellum is involved in the precise timing and temporal integration of movements. One could hypothesize that this structure has established a specific capacity to control skilled movements, especially in trained musicians practicing skilled movements each day. Cerebellar hemodynamic responses were studied by means of functional magnetic resonance imaging (fMRI) in highly skilled keyboard players and in control subjects during complex tasks requiring unimanual and bimanual finger movements. Both groups showed strong hemodynamic responses in the cerebellum during the task conditions; however, the responses were stronger in the nonmusicians. The authors suggest that this latter finding reflects the increased processing demands in this group. Skilled pianists rely on less cerebellar processing demands for this particular task. Similarly, the activation pattern found for unimanual movements with the dominant hand also reflects reduced processing demands in the musician group compared to nonmusicians. Nonkeyboard players involve both cerebellar hemispheres in the control of bimanually coordinated movements, whereas in highly skilled keyboardists, the dominant right cerebellar hemisphere leads. The authors suggest the expansion of the cerebellum in keyboard players is associated with a relocation of neural networks and with an increased efficiency in controlling bimanual movements. They believe that keyboardists use different cerebellar control modes for movements that involve their dominant right hand and left-handed finger movements.

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MacDonald L: Who cares for the conductor? *Choral J* 2004;45(3):43-47, 50–52.

According to the author, chair of voice studies at the University of Toronto, it is the conductors' own primary responsibility to care for his or her health. Inadvertently losing sight of one's own vocal needs while attending to students can lead to loss of confidence in singing ability and unintended abusive phonation. Caring for the voice requires a commitment of regular voice maintenance and exercise, and this is developed in six segments:

1. First is attaining efficient spinal alignment for singing, avoiding excessive muscle contractions that limit function. Several physical techniques are suggested.
2. Second is proper warm-up of the trunk ("core") muscles, as well as the vocal musculature. Techniques are given for this segment also.
3. Third is the performance of vocal exercises, or *vocalises*, warming up the technical aspects of singing. The importance of "warm-down" (shouldn't it be "cool-down?") is also emphasized.
4. Next is remembering the need for proper air, the fuel for singing.
5. The ability to achieve coordinated, athletic, efficient, and aerodynamic respiration also requires body awareness and use of the proper muscles.
6. Finally, caring for both speaking and singing voices requires a series of techniques and practices that requires personal knowledge and awareness. Dr. MacDonald presents a baker's dozen of these, including common-sense practices and avoidances and components of good general health for both singers and nonsingers. Avoidance of unneeded stress situations can minimize the potential for loss of voice skills, which itself adds to the conductor's stress level.

The information is well presented, despite containing a number of physiologically inaccurate phrases that may confuse the health professional; however, the musician who is used to understanding this type of visual imagery likely will have no problems.

Holschen JC: The female athlete. *Southern Med J* 2004;97(9):852–858.

Performers in all forms of dance have the same characteristics as competitive athletes. The female athlete remains less well understood and less well studied than male athletes, especially in the areas of performance factors, repetitive stress, and acute injuries. Dr. Holschen presents a well-organized and clear exposition of the various issues and factors faced by the female athlete and includes an extensive and thorough bibliography (95 references). Gender differences in multiple aspects of anatomy and physiology are related to various physical performance factors, as are biochemical differences and psychological factors such as the premenstrual syndrome. Obstetric and gynecologic issues discussed include menstrual disorders, iron deficiency

anemia, pregnancy, oral contraceptive use, and menopause. Comparisons with nonathletic populations are especially clear and revealing. Osteoporosis identification and treatment recommendations are given, as well as details of the female athletic triad. There is a section covering gender-specific orthopaedic injuries, including stress fractures, back pain, foot, and knee difficulties. The anterior cruciate ligament comes in for special scrutiny, although this is less of an issue with dancers. The article concludes with recommendations for future research topics, including improving female performance in athletics and reducing rates of injury. New studies should differentiate results seen in ovulating versus nonovulating females, as the effects of hormones on tissues and neuropsychology are vast.

Radionoff SL: Preparing the singing voice specialist revisited. *J Voice* 2004;18(4):513–521.

Discussions on the preparation of singing voice specialists can be traced to 1984 or earlier. Although this coincides with the beginnings of performing arts medicine, no formal academic program currently exists to train the singing voice specialist. The author feels the need now is greater than ever for such a training program, to prepare a person who will function as a liaison between (1) patient and laryngologist, (2) patient and voice scientist, (3) patient and speech-language pathologist, and (4) patient and voice teacher. Additional functions include being an educator to aid patient understanding, a trainer to help the performer maximize the balance of the vocal system, and a problem solver for many facets of the vocal performer's life and career. To meet the needs of a diverse singing population, care of the professional voice demands cross-disciplinary training. Knowledge from the fields of music, science, medicine, and communication disorders and experience/observation clinical preparation and research would provide for optimal preparation. The author advocates the development of a Master's degree program, and she proposes the structure of such a program, along with specific requirements outlined from the music and singing voice pathology components for a Master's Degree in Arts Medicine with a concentration in voice. The presentation is quite complete, although the author does not identify those university programs that already have components of the proposed curriculum in place.

YOGA

Reviewer's note: Special topics in this column do not arise solely from the accumulation over time of several papers on a given subject; occasionally, the subject presents itself within a relatively short period. The following publications on yoga fit the latter condition; they appeared within a 3-month interval in a single music library, all published in music journals, and all written by musicians or music teachers. I caution readers to recognize and understand the differences in terminology arising from the authors' nonmedical backgrounds and realize that musicians often depend on verbal imagery for understanding, rather than traditional physiologic and anatomic

terms. That said, the following articles are typical of what musicians can learn from fellow musicians in their own periodicals.

Soen EL: Yoga within the music studio. *Am Music Teacher* 2004;54(1):36–40.

Yoga is one of the six orthodox Indian philosophies. There are eight limbs or stages of yoga, one being the practice of the *asanas*, or poses. Practicing the *asanas* teaches total concentration and focus of the mind, control of the breath, and control of every part of the body in a mindful and conscious relaxation. This can be extremely helpful to prepare a student for taking a music lesson. The author describes *asanas* for breathing, designed to produce calmness and improved concentration, used at the beginning of each yoga session and useful also to start a music lesson. Eye *asanas* are beneficial in relaxing the eyes and also exercising the “optical” (i.e., extraocular) muscles. The major segment of the paper deals with preparing the entire body to play music by making it flexible and relaxed. To this end the author describes a series of *asanas* for the neck, shoulders, wrists, the body generally, the back, and spine and specific balancing routines. In each case, postures and movements are clearly described and coordinated with special breathing routines. For the musician who wishes to progress in yoga beyond these exercise routines, the author suggests taking a class from a reputable yoga studio where the instructor provides specific directions and may actually correct an improper pose.

Wilson NM: Hatha yoga as a tool for the prevention of performance-related musculoskeletal problems in string players. *Am String Teacher* 2005;55(1):62–66.

Many musicians do not prepare their bodies for the intense physical activity of playing, often leaving themselves susceptible to music-related physical problems. The practice of *hatha yoga*, with its emphasis on poses and physical conditioning, can serve to help maintain a healthy lifestyle and

prevent playing-related problems. The author presents techniques and conditions for preparing a string musician’s yoga session, followed by a description of six *asanas* which have different purposes and desired results for the body. Cool-down exercises are then explained, with a repeated emphasis on coordinating breathing patterns with the physical moves. Emphasis is placed on avoiding pain while performing the poses. The author concludes with sections on the benefits of yoga and on the application of it and other physical regimes to the educational setting, both in schools and private studios.

Adams J: Yoga for saxophonists. *Saxophone J* 2005;29(4):38–40 (pt 1); 29(5):37–39 (pt 2).

With its emphasis on balance and proper alignment, yoga can be an excellent method to help improve musical performance by increasing lung capacity, aiding relaxation, and improving blood circulation. For musicians with posture problems, many of which may be caused by playing their instruments, yoga can help keep the body in good physical shape. Part one of this two-part article continues with descriptions of four *asanas* or poses designed to improve back and spinal alignment. Like the previous two articles on yoga, the inclusion of pictures is quite helpful in clarifying the details of some poses. Unlike the others, however, no statement of desired gains or results is made. In part 2, Mr. Adams presents three *asanas* designed to expand the chest cavity and one to assist in reducing physical stress and increasing relaxation. He emphasizes the use of proper form and avoiding pain while practicing the *asanas*, as well as the necessity and effects of correct breathing techniques while exercising. While all three authors utilize several of the same poses, each describes one or more that are not mentioned by the others. Nothing is stated about an *asana* being specific for players of a particular instrument, so the inclusion of a particular pose seems to reflect the individual author’s preference.