

*Author's note:*

This bibliography was gathered to support a preliminary discussion regarding the retraining of brass players suffering from embouchure dystonia and related problems. The collection contains resources relating to brass-player's dystonia and the neighboring topics (most notably performance anxiety and occupational injuries).

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JOURNAL ARTICLES

Abdel, Jennifer. L., and Kevin. T. Larkin. "Anticipation of Performance Among Musicians: Physiological Arousal, Confidence, and State-Anxiety." *Psychology of Music* 18, no. 2 (1990): 171-82.

This article identifies the prominence of music performance anxiety (MPA) amongst musicians (25-50%), and relates self-evaluated anxiety to actual performance quality. In contrast, most studies on anxiety do not quantify the affect of MPA on performance. Abdel and Larkin identify a distinct gender difference in the effects of anxiety. As well, their method of gathering hard, physical data (heart rates, anxiety ratings, etc.) may apply in connecting lock-up to dystonic activity.

Altenmüller, Eckart. "Causes and cures of focal limb dystonia in musicians" in *Health and the Musician: Proceedings of the 1997 York Conference (BAPA)*, Scott, R., and J. Black, eds. BAPA Publications: London, 1998.

\_\_\_\_\_. "Causes et Traitements de la Dystonie de Fonction chez les Musiciens: Une Etude sur 5 Ans (Causes and Treatments of Focal Limb Dystonia in Musicians: A 5-year Study)." *Medecine des Arts: Approche Medicale et Scientifique des Pratiques Artistiques* 36 (June 2001): 19, 22-27.

Particularly interesting because of the 'causes.' It discusses possible causes, and cites botox as the best method of treatment to date (2001). Focuses on 190 musical, dystonic patients who were diagnosed in Hanover, Germany.

\_\_\_\_\_. "Focal Dystonia: Advances in Brain Imaging and Understanding of Fine Motor Control in Musicians." *Hand Clinics* 19, no. 3 (August 2003): 523-38.

Altenmüller discusses the function and structure of the brain's motor cortex in relationship to the development of musical skills. He attributes dystonia and cramp symptoms to abnormal conditions in this area of the brain (basal ganglia).

\_\_\_\_\_, Vanessa K. Lim, et. al. "Aberrant Sensorimotor Integration in Musicians' Cramp Patients." *Journal of Psychophysiology* 17, no. 4 (September 2003): 195-202.

\_\_\_\_\_, Patrick Raget, Alexander Smidt, and Hubert R. Dinse. "Superior Tactile Performance and Learning in Professional Pianists: Evidence for Meta-Plasticity in Musicians." *European Journal of Neuroscience* 19, no. 2 (January 2004): 473-478.

Altenmüller et. al define meta-plasticity, a brain/neurological-growth pattern, and describe its significance in development of musical skill. Hyperactive growth (out of control plasticity) in the brain has been blamed as a cause of dystonia. This is a projected result of overpractice, repetitive stress syndrome, and localized injuries.

\_\_\_\_\_, Yoshihiro Hirata, and Matthias Schulz. "Sensory Mapping of Lip Representation in Brass Musicians with Embouchure Dystonia." *Neuroreport: For Rapid Communication of Neuroscience Research* 15, no. 5 (April 2004): 815-18.

This article often appears in FD literature. It follows similar somatosensory (the sense of touch and feeling in the skin and internal body) studies in task-specific hand dystonia.

Brandfonbrener, A. G. "Musicians with Focal Dystonia: A report of 58 cases seen during a 10-year period at a Performing Arts Medicine Clinic." *Medical Problems of Performing Artists* 10, no. 4 (December 1995): 121-127.

Brandfonbrener's research summarizes data surrounding 58 dystonic musicians from Chicago between 1985 and 1995. She makes an important note in her own abstract: "Of particular interest was that eight patients [13.8%] noticed the onset of dystonia after attempting to make dramatic changes in their playing techniques." Some of her other observations may also link dystonia to lock-up. This report notes a rising awareness of dystonia in musicians and encourages further research, discussion, and public education.

Brodsky, Warren, John A. Sloboda, and Mitchell G. Waterman. "An Exploratory Investigation into Auditory Style as a Correlate and Predictor of Music Performance Anxiety." *Medical Problems of Performing Artists* 9, no. 4 (December 1994): 101-112.

The authors identify a direct connection between "auditory style" and performance anxiety. Auditory style, coined by Brodsky and Warren in 1993 in their *Keele Assessment of Auditory Style* (an unpublished test), describes an individual's method of aurally relating to their environment. A high auditory style preference leads to higher anxiety in music performers.

Byl, N. N., and A. McKenzie. "Treatment Effectiveness for Patients with a History of Repetitive Hand Use and a Focal Hand Dystonia." *Journal of Hand Therapy* 13 (2000): 289-301.

[This author appears in the Robert Bell dissertation on SFGI and yips.]

Callow, Nichola, Ross Roberts, and Joanna Z. Fawkes. "Effects of Dynamic and Static Imagery of Vividness of Imagery, Ski Performance, and Confidence." *Journal of Imagery Research in Sport and Physical Activity* 1, no. 1 (January 2006).

[JIRSPA is published by Berkeley Electronic Press. This article is available from their web space at <http://www.bepress.com/jirspa/vol1/iss1/art2>.] Callow et. al. address the importance of the vividness of imagery in eliciting a positive reaction from users/patients. Visualization of motor activity has been proven to increase self-efficacy and confidence, but the quality of vividness changes the quality of those effects.

Candia, Victor, T. Elbert, Eckart Altenmüller, et al. "Alteration of Digital Representations in Somatosensory Movement Therapy for Focal Hand Dystonia in Musicians." *Lancet* 353, issue 9146 (2 January 1999): 42.

[Kim & Altenmüller cite this article under a different name than it was published. "Alteration of Digital Representations" refers to the body's smearing of the digital (finger or toe) regions in the brain, likely an effort to compensate for dystonic symptoms. This topic, however, only covers the introductory paragraph of the article. The more accurate title was published: "Constraint-induced Movement Therapy for Focal Hand Dystonia in Musicians." Since Altenmüller authored both this and the citing source, I am inclined to believe that *Lancet* requested or applied a different title than that of the original article submission.]

Candia et. al. have published the results of a small pilot treatment for instrumentalists suffering from hand dystonia. They worked with five performers (three piano, two guitar) by constraining the motion of dystonic fingers and muscle groups. In four of their patients, the treatment was a significant, long-term success. Looking forward, this type of treatment has since been researched and shows promise for large muscle groups. A similar method does not exist for embouchure dystonia, however, as the muscles are not readily constrained by mechanical means. Alternatively, brass players may find this information supports treatment through nontraditional embouchure rehabilitation. This research suggests that habitual use of an improper embouchure may contribute to lock-up or dystonia.

\_\_\_\_\_, Christo Pantev, A. Engeliën, and T. Elbert. "Representational Cortex in Musicians: Plastic Alterations in Response to Musical Practice." *Annals of the New York Academy of Sciences* 930 (June 2001): 300-314.

Cortical reorganization helps musicians achieve their high levels of skill, but reorganization and overuse may cause physical, motor malfunction. PTSD is named as a particular outcome of 'maladaptive ... plastic reorganization.'

\_\_\_\_\_, Thomas Schafer, Brigitte Rockstroh, Thomas Elbert, Edward Taub, Harald Rau, and Eckart Altenmüller. "Sensory Motor Retuning: A Behavioral Treatment for Focal Hand Dystonia of Pianists and Guitarists." *Archives of Physical Medicine and Rehabilitation* 83, no. 10 (October 2002): 1342-1348.

Rehabilitation practices for FTSD in the hands.

\_\_\_\_\_, Christian Wienbruch, Elbert Thomas, Brigitte Rockstroh, and William Ray. "Effective Behavioral Treatment of Focal Hand Dystonia in Musicians Alters Somatosensory Cortical Organization." *Proceedings of the National Academy of Sciences of the U. S. A.* 100, no. 13 (24 June 2003): 7942-7947.

Effects of focal dystonia on the physical body and brain.

Dalrymple, Glenn V., Glen S. Estrin, Jeanine Gaboury-Sly, and Philip Rosenthal. "Medical Problems and Horn Playing." *The Horn Call: Journal of the International Horn Society* 34, no. 2 (February 2004): 52-60.

Personal experiences with dystonia, pinched nerves, and the performance-enhancing drug Inderal. Discussions from the 2003/Bloomington IHS conference.

Esplen, Mary Jane, and Ellen Hodnett. "A Pilot Study Investigating Student Musicians' Experiences of Guided Imagery as a Technique to Manage Performance Anxiety." *Medical Problems of Performing Artists* 14, no. 3 (September 1999): 127-32.

Evans, Lynn, Rebecca Hare, and Richard Mullen. "Imagery use during Rehabilitation from injury." *Journal of Imagery Research in Sport and Physical Activity* 1, no. 1 (January 2006).

[JIRSPA is electronically produced by Berkeley Electronic. This article is available from <http://www.bepress.com/jirspa/vol1/iss1/art1>] Evans et. al. document the use of healing and pain-reducing imagery in the cases of four professional & semi-professional athletes. They include imagery exercises and statements, and quantify the usefulness of imagery in the recovery process.

Fahn, S., S. B. Bressman, and C. D. Marsden. "Classification of Dystonia." *Advances in Neurology* 78 (1998): 1-10.

Fahn et. al set down the guidelines for labeling different types of dystonia, the primary characteristics being "age at onset, distribution [where it affects the body], and etiology [root causes]." They also note that the "distribution of dystonia is a partial indicator of severity of dystonia..." This fact, largely unmentioned in other literature, suggests that focal dystonia is one of the weakest forms of the disease, or at least the most likely to react well to treatment. Similarly, although lock-up is known to have a variety of solutions, none are clearly effective in all cases. Also, Fahn and company "... suggest that ... tremor can be part of the phenotypic expression of idiopathic dystonia." In short, tremor may a symptom of dystonia, not just a standalone malady. This link is clearly important, as the lock-up mechanism also induces tremor, which may become a habitual response over time. [p. 1 "Tremor in the idiopathic dystonias may be due to a dystonic tremor (17), which results from rhythmic group action potentials that occur in dystonia (56)." What are rhythmic group action potentials? Referring to muscle groups?]

Fernandez, Pardal, Maria Manuel, Ana Maria Pardal, Emilia Mabel Gatto, and Ricardo Claudio Reisin. "Playing Harp, Another Unusual Task-Specific Dystonia." *Movement Disorders* 16, no. 4 (July 2001): 778-779

A familial harp-playing dystonia accompanied by essential tremor. Familial musician's dystonia is very uncommon, so this represents a unique case worth consideration.

Frucht, Steven, Stanley Fahn, and Blair Ford. "French Horn Embouchure Dystonia." *Movement Disorders* 14, no. 1 (January 1999): 171-173.

Although this study only included two performers (female, french horn), the treatment results are interesting. For each subject, switching to a larger, trombone mouthpiece gave reasonable and long-term positive results. The results suggests that retraining is possible as long as performers and teachers are both dedicated and creative in their methods. Note Jacob's commentary on switching equipment: the body

knows, and the 'newness' of a given thing will always make one play/perform differently (*Song and Wind*). Perhaps drastically changing equipment may detour the series of events leading to long-term dystonia.

\_\_\_\_\_, B. Ford, and Stanley Fahn. "Focal Task-Specific Dystonia Induced by Peripheral Trauma." *Movement Disorders* 15, no. 2 (March 2000): 348-350.

Documents two cases of FTSD, each likely caused by overuse and subsequent injury. Frucht et. al believe that the cite of injury is more important than the 'nature of the trauma.'

\_\_\_\_\_, S. Fahn, P. E. Greene et. al. "The Natural History of Embouchure Dystonia." *Movement Disorders* 16, no. 5 (September 2001): 899-906.

Frucht et. al. provide the results of their study of 26 individuals with focal embouchure dystonia. They have also made video records of these individuals. Most important, Frucht mentions a performer whose dystonia was accompanied by 'lip lock,' completely blocking the air passageway. None of these patients had a family history of dystonia, eliminating the possibility of inheritance. Musical qualities are also discussed: patients usually suffered from dystonic symptoms only in one register or one style of playing, affecting articulation, etc. Again, these details overlap in some areas with stuttering or locking symptoms, significant links. (Unfortunately, it should be noted that the work of Dr. Frucht is not always approved by his colleagues in the PAMA. In particular, some authors disapprove of his diagnosis of performers via videotape analysis, rather than in-person meeting; discussion b/t author and Stanek, patient/student of Brandfonbrener).

Fry, Hunter J. H. "Treatment of Medical Problems of Performing Musicians: Overuse Syndrome." in *Applications of Music in Medicine*. Washington: NAMT Inc., 1991.

Fry and his materials are often cited in other dystonia research. He blames overuse (repetitive strain) as a significant cause of FTSD and other injuries. Painless FTSD appears, in this study, in about 1/100 of all performer injuries.

Hallett, Mark. "Is Focal Dystonia a Central Nervous Problem?" *Medical Problems of Performing Artists* 14, no. 1 (March 1999): 4-7.

Classifies FTSD as a brain disorder which may be 'unlearned.' Also assigns cause to repetitive motions (repetitive stress syndrome). The possibility of retraining through dystonic habits suggests a closer link to stuttering, which also shows some success with retraining.

Iltis, P. W., and M. W. Givens. "EMG Characterization of Embouchure Muscle Activity: Reliability and Application to Embouchure Dystonia." *Medical Problems of Performing Artists* 20, no. 1 (March 2005): 25-34.

Jabusch, Hans-Christian, Henning Vauth, and Eckart Altenmüller. "Anxiety as an Aggravating Factor during onset of Focal Dystonia in Musicians." *Medical Problem of Performing Artists* 19, no. 2 (June 2004): 75-81.

Jankovic J., and H. Shale. "Dystonia in Musicians." *Seminars in Neurology* 9 (1989): 131-135. [RC 321 S44 V.9 1989 Life Science Library]

Jankovic and Shale observe a significant connection between tremor and dystonia (10 of 28 focal, task-specific dystonia patients). They also note that their patients normally began displaying dystonic symptoms "...when practicing intensely for an important performance or competition" (p. 132, para 1). Although the authors claim that peripheral musicians' dystonia is "...caused by a combination of overuse injuries and nerve entrapment," the former is not necessarily a proven link. [Their citation is from Graffman, G. "Doctor, Can You Lend an Ear?" *Medical Problems of Performing Artists* 1, no. 1 (March 1986): 3-6. Unfortunately, this article does not directly support their statement.] They also cite overuse syndrome as a contributor [Fry, H. J. H. "Overuse Syndrome in Musicians: Prevention and Management." *Lancet* 2 (1986): 728-733.] and assert that 'overuse' is synonymous with long-term 'misuse' ("faulty technique" p. 133, para 1). Unfortunately, overuse or misuse has been proven to cause nerve & muscular damage (p. 133, para 1). As opposed to peripheral dystonia, they discuss "inherited or idiopathic" forms. The first, however, is of most concern in connection to lock-up.

Lederman, Richard J. "Occupational Cramp in Instrumental Musicians." *Medical Problems of Performing Artists* 3, no. 2 (June 1988): 45-51.

Lederman begins his discussion with a short history of cramp (dystonia) in musicians, citing the earliest recorded cases of the disease from ca. 1840. This article describes Lederman's experience with 21 afflicted musicians between 1979 and 1986, "emphasizing the clinical features, ... course, and ... inability to identify a consistently effective treatment." The symptoms recorded for brass players included spasms, cramps, decreased control, and loss of seal between the lips and mouthpiece while playing. His discussion also discusses the symptoms when dystonia first arose: "These included excessive practicing or playing..., a change in technique or a new instrument ..., trauma ..., and unusual emotional stress ... ." These symptoms may be similar to those which will induce a habitual lock-up.

\_\_\_\_\_. "Focal Dystonia in Instrumentalists: Clinical Features." *Medical Problems of Performing Artists* 6 no. 4 (December 1991): 132-136.

Following some historical information about the first known cases of dystonia in musicians, Lederman asserts that "[t]he Frequency of occupational cramps among musicians is unknown." The author cites having about 8% of his own patients having dystonia, and refers to another clinician who saw a constant 14% over five years. His breakdown of dystonic features indicates the prevalence of particular symptoms including tremor (10% of cases) and loss of seal in the wind-player's embouchure (7%), involuntary movement (36%), stiffness or cramping (50%), and impaired control (57%). These symptoms would all likely appear in a lock-up scenario. Lederman groups dystonics into instrumental groups, brass players accounting for 20% of the 42 cases he saw (2<sup>nd</sup> only to percussion). Finally, he also discusses some of the '...triggering or precipitating events that may precede the onset of focal dystonia in musicians in others.'

\_\_\_\_\_. "Embouchure Problems in Brass Instrumentalists." *Medical Problems of Performing Artists* 16, no. 2 (June 2001): 53-57.

Leijnse, J. H. A. L. "Anatomical Factors Predisposing to Focal Dystonia in the Musician's Hand: Principles, Theoretical Examples, Clinical Significance." *Journal of Biomechanics* 30 (1997): 659-669.

Connects interosseous strain to development of focal dystonia (membrane strain).

Lim, Vanessa K., and Eckart Altenmüller. "Musicians' Cramp: Instrumental and Gender Differences." *Medical Problems of Performing Artists* 18, no. 1 (March 2003): 21-26.

Lim and Altenmüller address one of the significant shortcomings in comparable musicians' dystonia research: a lacking comparison against the ratio of healthy men and women in the field. Their research emphasizes that musicians' cramp has a gender bias (towards men), even after accounting for the healthy gender distribution of professional musicians. This information will be extremely useful if there is other research describing gender-bias in brass player's lock-up.

Liston, Marnie, Alexandra Frost, and Philip Mohr. "The Prediction of Musical Performance Anxiety." *Medical Problems of Performing Artists* 18, no. 3 (September 2003): 120-125.

Lombart, Kenneth G., Gail Berenson, Paul Salmon, and Cheryl Powell Shook. "Performance Impairments, Injuries, and Stress Hardiness in a Sample of Keyboard and Other Instrumentalists." *Medical Problems of Performing Artists* 10, no. 4 (December 1995): 140-146.

Stress hardiness, a 'cognitive mediator' reduces the incidence of performer injuries and lowers anxiety.

Macauley, Beth L., and Karen D. Steckol. "Musical Stuttering: A True Scenario and a Genuine Phenomenon." *American Speech-Language-Hearing Association Leader* (5 October 2005): 8. Available online: <http://www.asha.org/about/publications/leader-online/archives/2004/0410205/f041005c.htm>.

This is one of the first articles to claim a clear connection between spoken stuttering and musical stutter/lock-up. Macauley teaches at the University of Alabama, where Martin Chochran wrote a 2004

DMA dissertation on the connection between the two. The relationship between the two is important, but Macauley does not discuss either causes or methods for treatment.

Nutt, J. G., M. D. Muentzer, L. J. Melton, et al. "Epidemiology of Dystonia in Rochester, Minnesota." *Advances in Neurology* 50 (1988): 361-365.  
[??? A geographical link to dystonia? Community-oriented? Get this article]

Pascual-Leone, Alvaro. "The Brain that Plays Music and is Changed by It." *Annals of the New York Academy of Sciences* 930 (June 2001): 315-329.  
'Plastic reorganization of the brain' as a method of assisting motor function. Author projects that over-use and over-reorganization may contribute to or cause physical dysfunction, specifically FTSD.

Richards, Alison, Lorraine Merritt, and Pamela Davis. "Performance Anxiety: Loss of the Spoken Edge." *Journal of Voice* 15, no. 2 (June 2001): 257-69.  
Successful use of preparation and positive imagery to reduce MPA.

Rife, Nora A., Leah Blumberg Lapidus, and Zachary M. Shnek. "Musical Performance Anxiety, Cognitive Flexibility, and Field Independence in Professional Musicians." *Medical Problems of Performing Artists* 15, no. 4 (December 2000): 161-66.  
connection between 'cognitive flexibility' and MPA is proven.

Sand, Barbara L. "Man for All Seasons." *Strad* 114, no. 1354 (February 2003): 132-36.  
Barbara Sand speaks to conductor and violinist Peter Oundjian about his experience with focal hand dystonia. Dystonia forced Oundjian to leave the Tokyo String Quartet in 1995, a change he describes as being "...a tremendous relief." The article gives an interesting view into the psychology of an excellent performer affected by dystonia, and may reveal connections between professional/occupational psychology and the development of dystonia.

Sankhla, C., E. C. Lai, and J. Jankovic. "Peripherally Induced Oromandibular Dystonia." *Journal of Neurology Neurosurgery and Psychiatry* 65 (1998):722-728.

Sataloff, Robert Thayer, Deborah Caputo, and Steven H. Levy. "Medical Treatment of Performance Anxiety: A Comprehensive Approach." *Medical Problems of Performing Artists* 14, no. 3 (September 1999): 122-26.  
Use of pharmacological treatments for MPA. Classifies performance anxiety as a social phobia, and recommends exploring alternatives to long-term chemical treatments.

Scarlate, G., S. Barbieri, A. Priori, A. Pesenti, and A. Cappellari. "Limb Immobilization for the treatment of Focal Occupational Dystonia." *Neurology* 57, no. 3 (14 August 2001): 405-409.  
An experimental variation on constraint-induced movement therapy, including brain imaging. Restraint has previously proven to cause 'the motor cortical representation of the immobilized limb to shrink.' Subjects were immobilized at length (thus shrinking this cortical representation), which helped to alleviate their dystonic symptoms.

Schuele, Stephan, and Richard J. Lederman. "Focal Dysontia in Woodwind Instrumentalists: Long-term Outcome." *Medical Problems of Performing Artists* 18, no. 1 (March 2003): 15-20.  
Perhaps most significant, this article declares a 50% rate of professional retirement in players who become afflicted with focal dystonia. The study covers both hand and embouchure dystonias, and does make mention of successful rebuilding of embouchure as a possible method of treatment.

Schott, G. D. "The Relationship of Peripheral Trauma and Pain to Dystonia." *Journal of Neurology, Neurosurgery, and Psychiatry* 48, no. 7 (July 1985): 698-701.  
Schott discusses four cases where peripheral (minor) physical injury preceded the development of dystonia in non-musicians. Three involved major limbs (arm, leg), with the fourth leading to writer's cramp in the right thumb. [statistical data: "... dystonia muscular deformans, has an estimated prevalence in the USA of three per million." Eldridge, R. "The Torsion Dystonias: Literature Review and Genetic and

Clinical Studies.” *Neurology (Minneapolis)* 20, part 2 (1970): 1-78.] If Scott’s association is correct, one may well argue an injury-induced progression between lock-up and focal dystonia.

[notice that the country-wide numbers are 1/3 million ... but within musicians it's 1/100 ... ?]

Sloboda, John A., and Susan A. O’Neill. “The Effects of Failure on Children’s Ability to Perform a Musical Test.” *Psychology of Music* 25, no. 1 (1997): 18-34.

\_\_\_\_\_, Richard Holmes, and Patricia Holmes. “The Science and Psychology of Music Performance: Creative Strategies for Teaching and Learning.” *Music Education Research* 6, no. 1 (March 2004): 111-121.

Taylor-Munro, Chris. “Are you KILLING your CAREER? A Musician’s Guide to Good Health.” *Canadian Musician* 26, no. (July-August 2004) 49-56.

Tubiana, Raoul. “Prolonged Neuromuscular Rehabilitation for Musician’s Focal Dystonia.” *Medical Problems of Performing Artists* 18, no. 4 (December 2003): 166-169.  
Study of the physical precursors to focal dystonia, including prolonged movements, postures, etc.

Widmer, Suzanna, Ashley Conway, Stanley Cohen, and Peter J. Davies. “Hyperventilation: A Correlate and Predictor of Debilitating Performance Anxiety in Musicians.” *Medical Problems of Performing Artists* 12, no. 4 (December 1997): 97-106.  
Connects hyperventilation to MPA. Note that arrhythmic breathing patterns are also common in dystonic subjects, no matter where the dystonia affects the individual. (dissertation: La Blance, Gary Robert “Breathing Patterns...”)

Workman, Darin. “The Roadblock for Auditions: Stage Fright.” *Percussive Notes* 37, no. 4 (August 1999): 50-55.

Discussion of practice methods and routines for treating stage fright, and disadvantages to using chemicals.

## DISSERTATIONS

Alm, Per A. "On the Causal Mechanisms of Stuttering." Ph. D. diss., Lunds Universitet (Sweden) (2005).

Alm notes: "Superfluous muscular activation accompanying stuttering may be a type of dystonia: involuntary contractions related to the basal ganglia disturbance." He also considers the importance of minerals (esp. calcium) in diet, and how low Ca levels can affect excitability and anxiety. The suggestion of basal ganglia disturbance follows current research in dystonia, which locates its dysfunction in that part of the brain.

Barrowcliffe, Kelly Dawn. "The Knowledge of Playing-Related Injuries Among University Music Teachers." M. Sc. diss., University of Western Ontario (Canada), 1999.

Bell, Robert. "Pick it up, it's Good: Utilizing Solution-Focused Guided Imagery with Golfers Experiencing the Yips." Ph. D. diss., University of Tennessee-Knoxville, 2006.

Bell tests the effects of counseling golfers using some of the most recent techniques of sport psychology. Although his results are positive, they do not have a long-term follow up. The complete program last 12 weeks, with counseling treatments extending into the later weeks. His research does unify anxiety, performance, efficacy, and treatment in a unique way that may be generally applicable to music performance.

Cochran, Martin Edmond. "A Comparison of the Behavior and Characteristics of Speech Stuttering with Musical Stuttering (i.e. Valsalva Maneuver) in Brass Playing." D. M. A. diss., University of Alabama (2004).

Cochran's dissertation links spoken stuttering to musician's lock-up, or hyperactive valsalva. His report concludes with exercises and suggestions for prevention of stuttering prevention and rehabilitation from habitualized patterns.

Deen, Diana Rhea. "Awareness and Breathing: Keys to the Moderation of Musical Performance Anxiety." Ph. D. diss., University of Kentucky (1999).

Successful reduction of MPA using awareness and breathing study (practice) as a warmup to each practice routine. Daily implementation leads to successful MPA control.

Dowdy, Diane Muench. "Temporomandibular Joint Dysfunction in Brass Players: A Survey and Analysis of Related Literature." M. M. Ed. thesis, Southeast Missouri State University (1991).

According to Frucht et. al. ("The Natural History of Embouchure Dystonia." *Movement Disorders*, September 2001) focal dystonia is sometimes misdiagnosed as temporomandibular joint dysfunction (TMJ). Research discussion on dystonia and lock-up would do well to consider TMJ, another common performance-related dysfunction.

De Felice, Maluh Guarino. "Mindfulness Meditation: A New Tool for Understanding and Regulating Musical Performance Anxiety. An Affective Neuroscientific Perspective." D. M. A. diss., University of Miami (2004).

Regarding the use of mental self-talk and positive/negative thought awareness.

Futrovsky, Lee Edward. "Defense Mechanisms and Social Support as Predictors of Adjustment after Treatment for a Speaking Disorder." Ph. D. diss., Columbia University (1992).

Research in support of anxiety as a stumbling block to proper recovery and rehabilitation from stutter.

Jones, William Oberst. "Speech Disorder Associated with Dystonia Musculorum Deformans." Educat. D. diss., Columbia University (1968).

Jones' dissertation is historically significant, as it predates the establishment of music & medicine research, as well as general acceptance of connection between musical stutter and vocal stutter. Macauley et. al (University of Alabama) are currently discussing the connection between stuttering in performers and speaking, while Jones' study links dystonia to other speaking disorders.



LaBlance, Gary Robert. "Breathing Patterns of Individuals with Dystonia Musculorum Deformans." Ph. D. diss. (Speech Therapy), Northwestern University (1984).

LaBlance's dissertation project collected data on breathing rates and patterns from a group of dystonic individuals. Compared against non-dystonic, control subjects, the dystonics had abnormal breathing habits. Some suffered from apnea (extended periods without breathing), shallow breathing, or irregular rhythm in their breathing. The breathing symptoms were evident no matter what kind of dystonia affected the patients. Arrhythmic/abnormal breathing clearly has negative implications for wind players, and may be connected to stuttering or locking.

Pearson, Kathryn R. "Design and Development of the Self-Efficacy for Musical Studies Scale." M. S. thesis (Instructional Psychology and Technology), Brigham Young University (2003).

Self-efficacy drastically affects how individuals choose and meet goals and challenges. The importance of psychology in any pedagogical method cannot be understated. Integration of these materials may help assure that the complete method text is accountable.

Sanders, Camille Marguerite. "Understanding the Effects of Injury on a Musician's Identity and Self-Concept." M. S. thesis, Rush University College of Nursing (1998).

Tartalone, Philip Michael. "Patterns of Performance Anxiety among University Musicians Preparing for Brass Area Jury Recitals: Physiological Arousal and Perceived State of Anxiety." Ph. D. diss., Michigan State University (1992).

Trusheim, William. "Mental Imagery and Musical Performance: An Inquiry into Imagery Used by Eminent Orchestral Brass Players in the United States." Ed. D. diss., Rutgers University (1987).

Turon, Charles Thomas. "Educational Prerequisites for Piano Teachers assisting in the Prevention, Detection, and Management of Performance-Related Health Disorders." Ph. D. diss., University of Oklahoma, 2000.

Turon discusses some of the shortcomings of traditional, academic preparation of instrumental music teachers. As his title suggests, a background in performance-related health concerns should form a part of basic pedagogical training.

Wikman, Erik Charles. "Experiences of Chronic Procrastination." Ph. D. diss., University of Alberta (2001).

Connects the mental game and procrastination to performance anxiety and social phobias.

## BOOKS

Altenmüller, Eckart, Jürg Kesselring, and Mario Wiesendanger, eds. *Music, Motor Control, and the Brain*. Oxford, New York: Oxford University Press, 2006.

Altenmüller et. al. are one of the most active research teams in the field of music-performance related dystonias. The final five chapters are devoted to "Apollo's curse: loss of motor control in musicians." Chapter 17 in particular, "Epidemiology, phenomenology, and therapy of musician's cramp," sums up much of the research of the past two decades.

Anderson, Karen E., William J. Weiner, and Anthony E. Lang, eds. *Behavioral neurology of movement disorders*. Philadelphia: Lippincott Williams & Wilkins, 2005.

*Behavioral Neurology* includes a complete section entitled "Ataxis, essential tremor, and dystonia," as well as material in other closely related areas: Parkinson's, "other akinetic rigid syndromes," etc. [UT LIB: RC 321 A276 V.96 Life Science Library]

Colgrass, Michael. *My Lessons with Kumi: How I learned to Perform with Confidence in Life and Work*. Moab, UT: Real People Press, 2000.

Evans, James and Manfred Clynes, eds. *Rhythm in Psychological, Linguistic, and Musical Processes*. Springfield, IL: Charles C. Thomas, 1986.

This text was first published at the same time as the foundation of the MPPA. Its discussion of entrainment in learning and therapy is particularly useful, and describes the significance of entrainment on parallel systems. Although the article on Dysrhythmia initially seems worthwhile, it poses more questions than it answers.

Frucht, Steven J., and Stanley Fahn, eds. *Movement Disorder Emergencies*. Totowa, New Jersey: Humana Press, 2005.

Frucht represents the New York school of research on dystonia, and his previous work has appeared in musical journals such as the *Horn Call*. This volume includes a CD-ROM. It will be useful to view whatever electronic materials are included, especially if there are videos of dystonic symptoms.

Jankovic, Joseph, ed. *Dystonia*. New York: Demos Medical Publications, 2005.

Of note: "Rehabilitation Exercises," by Daniel Troung, Mayank Pathak, and Karen Frei. Full text available electronically (but not via UT Electronic Access, as OCLC reports).

London, Justin. *Hearing in Time*. Oxford: Oxford University Press, 2004.

London's text focuses upon on the interpretation and significance of time in music, both to the performer and listener. His analysis is academic and deconstructionist. Although *Hearing in Time* does not direct its focus toward individuals with performance anxiety, London devotes almost a complete chapter to entrainment and its significance. His analysis may suggest that performers develop lock-up and other anxiety when they lose their natural sense of temporal entrainment.

Norris, Richard. *The Musician's Survival Manual: A Guide to Preventing and Treating Injuries in Instrumentalists*. San Antonio, TX: International Conference of Symphony and Opera Musicians, 1993.

Dr. Richard Norris was prompted to write his *Survival Manual* after working with injured musicians and giving a complete course on musicians' health at the New England Conservatory. Although this text is not hard-line academic, each chapter includes a modest list of references and suggested readings. One part of his book has been devoted to discussion of focal dystonia, a term which he declares is interchangeable with occupational cramp.

Parncutt, Richard and Gary E. McPherson, eds. *The Science & Psychology of Music Performance: Creative Strategies for Teaching and Learning*. New York: Oxford University Press, 2002.

This collection includes an article by Heinz Fadle, a trombone-playing pedagogue in the ongoing discussion of musicians' focal dystonia. The *Strategies* also includes essays on performance anxiety, the

significance of community and psychology in musical development, and analyses related to individual performance areas (winds, strings, voice, etc.).

Roland, David. *The Confident Performer*. Portsmouth, New Hampshire: Heinemann, 1998.

Dr. David Roland is from the University of Wollongong (Wollongong, Australia). *The Confident Performer* follows his article on stage fright (Roland, David. "Stage Fright: If You're Not Nervous, You're Dead." *Rolling Stone* (July 1993) Australia.) Roland does not address dystonia or cramping directly, but instead follows the style of Gallway in *The Inner Game*. As a solvency text, *The Confident Performer* is something akin to a streamlined *Inner Game*, containing more focus on the most useful areas of performance anxiety, practice, and preparation.

Sataloff, Robert Thayer, Alice G. Brandfonbrener, and Richard J. Lederman, eds. *Textbook of Performing Arts Medicine*. New York: Raven Press, 1991.

Self-proclaimed as the "first modern textbook in a new and exciting field of medicine," the TPAM contains 15 sections, each one devoted to a particular area of musical ailment, and each one written by an individual specialist. For any discussion of medicine in the performing arts, this text is invaluable.

Salmon, Paul and Robert G. Meyer. *Notes from the Green Room: Coping with Stress and Anxiety in Musical Performance*. New York: Lexington, 1992.

Salmon and Meyer offer a collection of methods for dealing with performance anxiety. They believe that "...behavior is governed by the confluence of a variety of factors..." an assumption from cognitive-behavioral research. The *Green Room* tools aim at wide solutions rather than focusing on specific issues.

Smith, Brenda, and Robert Thayer Sataloff. *Choral Pedagogy*. San Diego, California: Singular Publishing Group, 2000.

Smith and Sataloff devote a section of their *Pedagogy* to "Vocal Health and Pedagogy," strapping on a chapter concerning "Performing-Arts Medicine and the Professional Voice User: Risks of Nonvoice Performance." In a section addressed to wind players, the authors assert the danger of poor air support. Although they describe various embouchure injuries due to poor breathing, they do not cite their source.

In addition, the authors describe how "Abrupt, irregular, or uncontrolled changes in the flow of air require large compensatory muscular adjustments at the oscillator [throat] that interfere with controlled tone production, quality, and endurance. Moreover, if the column of air is not sufficiently constant and powerful to drive the instrument or voice, the performer usually attempts to compensate with excessive muscle contraction not only at the oscillator [throat or lips], but also elsewhere in the head or neck. This is observed most easily in singers as hyperfunctional activity in the face, jaw, and strap muscles, and as tongue retraction." (p. 64; cite: Sataloff, RT. "Professional Singers, Part II" *Journal of Voice* no. 1, 1987: 191-201.). The tongue retraction in particular, due to both the increase in tension and the tongue's relationship to the throat, is interesting here. Whether or not these assertions are completely applicable to dystonic individuals, the anxiety-reducing and strength-building properties of proper breathing are clearly beneficial.

Velotis, Calvin M. *Anxiety Disorder Research*. New York: Nova Science, 2005.

This collection includes the Altmuller team's "The Role of Anxiety in the Development of Focal Dystonia in Musicians." [OCLC: 60345392]

Wilson, Glenn D. *Performance Anxiety*. New York: Oxford University Press, 1997.

Music performance anxiety affects 25-50% of all performers, and has a variety of predictors and causes. Alexander Technique, relaxation techniques, etc. are helpful, but long-term chemical solutions are discouraged.