**A Perfect Storm: How teaching, performing, the Feldenkrais Method, and dystonia inadvertently created a base for exploring learning, injury, and complexity**

Dr. Lisa M. Burrell, Lone Star College, Houston, Texas USA
rilkesq@yahoo.com, www.lisaburrellviolin.com, www.lisaburrellviolin.wordpress.com

I. Common Threads: Studying Music, Feldenkrais, Teaching

*'There is no exercise, though never so healthful and innocent, but what may produce great disorders, if it is used with intemperance,"* are the words of Bernardino Ramazzini, who was in 1713 the first to describe an overview of occupational diseases of musicians (Sataloff et al, 2010; Bejjani et al, 1996)

II. A Front Row Seat to the Complexity of Learning—Retrospective observations of my own experience pre-training, during the training, and continued exploration

A. My Experience Pre-Feldenkrais Training

- Performance/practice issues—problems with repetition, timing, tension
- Early dystonia symptoms—too much too fast, clarity issues
- Personal success, remission with Taubman Method work
- Teaching—clinics, presenting, individual work—questions about application
- Work with injury and musicians—bigger questions and feeling that the answers were inadequate
- Why Feldenkrais appealed to me as a kind of modality that might begin to provide more effective ways of working with people

B. Early Learning in My Training—Why I stayed engaged and eager for more

- Fast changes—noticing major changes in my feeling and movement every day
- Faster thinking—feeling almost a high from how quickly thoughts formed and tangents grew along various paths and led to interesting ends
- Spontaneous explosions of ideas—I felt full of wild creative impulses
- Fascination with ATM and how easy and natural it felt to deconstruct and put to use in my teaching intentionally
- Spontaneous discovery in teaching and playing that felt like super powers

C. The Difficulties—Emerging dystonia

- Change and confusion
- Changes that seemed to happen too fast or keep going
- Feeling good in a lesson and finding tightening and pain in the hours and days afterwards—being on the express train with no local stops
- Increasing extremes of fight/flight
- Increasing balance and proprioceptive issues
- Inability to recognize myself—no earworms, not able to perform tasks I thought were instinctive for me
- No choices, or too many, but not the chance to go back to find an old compensation

- Difficulties with communication—blank, floating, absence of pain, not able to form ideas, concepts, almost drunk

III. Dystonia Characteristics—What they are, what happens when they come together in a person, what makes some people develop dystonia and others with some of the same characteristics avoid dystonia

A. Hyper-plasticity

- Faster synaptic formation
- Long term synaptic potentiation
- Stronger connectivity
- Basal ganglia circuitry
- Increased neurotransmitter activity

B. Abnormal Inhibition

- Spread of neuromuscular activity to surrounding muscle groups—lack of surround inhibition leading to cortical blurring
- A timing problem—excitation signals are too fast and constant
- Inhibitory signals cannot keep up with the excitation
- The role of the basal ganglia—unconscious action selection
- Changes in the peripheral nervous system with inhibitory receptors

C. Sensory Integration and Proprioceptive Dysfunction

- Balance issues—inner ear, vestibular, ocular
- Vestibular lesions—sometimes measurable pathology (my testing)
- Proprioceptive dysfunction in the brain—much more difficult to diagnose and treat
- Processing of sensory information—hyper response to stimulus at the peripheral level, compounded by cortical blurring caused by abnormal inhibition
- The role of neurotransmitters—Dopamine and Acetylcholine and the pleasure/pain response to sensory stimulation—how this makes the guidelines of sensing and feeling a complicated task

D. Trigger Factors

- Changes in compensation
- Physical trauma
- Emotional trauma and stress
- Increases in sensory-motor stimulation
- High demands on sensory motor precision

E. Feldenkrais and Dystonia—My own observations and theories

- Non-degenerative, but hyper-functioning—sensory learning is a stimulus
- Problems with circuitry in loops in the equation—is it an issue of self-regulation?
- Integration and its complexity
- What does it mean to over-learn? Is there a way to understand what is too much? How do neurotransmitters make this more complex?
- Problems with repetition—historically for me, and how this amplified in Feldenkrais work for me
- Compensations and triggers—what does it mean to lose a compensation for vestibular function, necessary antagonistic contraction, explore surround inhibition in too much detail, further differentiation of susceptible patterns
- Sensory dysregulation—the feeling of wanting to keep going, following the easy path, the easy path often representing the dystonic pattern (a path through the field too deeply carved)
- Working with stability and undifferentiated movement, versus excess differentiation

F. Article Responses—Individual case descriptions and overall commonalities and how they have shaped my questions and research

- Cerebral Palsy and secondary dystonia
- Oriental dance and FI/ATM—Katerina's story
- Difficulties with sensory integration following training/Feldenkrais work
- Being misunderstood, inability to communicate problems to practitioners/trainers
- Difficulties with coming forward and communicating now
- Trainers and practitioners valuing these experiences, encouraging trance states, loss of control, long periods of disintegration, the concept of breaking down and rebuilding from a place free of compensation

IV. Injury and Musicians—Where this process has taken me in my study, research, practice, and teaching

A. Musicians and Dystonia—Some recent studies

Neurological Considerations for Musicians: Chronic Pain Symptoms and Dystonia
Anna M. Zamorano, Inmaculada Riquelme, Boris Kleber, Eckart Altenmüller, Samar M. Hatem, Pedro Montoya (January 2015). *Pain Sensitivity and Spatial Acuity are Altered in Healthy Musicians as in Chronic Pain Patients*

- Intense repetitive and spatially specific training over many years combined with integration of multi-sourced sensory and motor information creates

changes in both the "functional and structural organization of the somatosensory system"
- Change in plasticity, hyper-plasticity creates conditions for neurological problems like dystonia
- These changes in plasticity also may lead to conditions in the brain and nervous system similar to chronic pain patients, even among musicians who do not experience pain/injury
- Most professional musicians have accumulated 10,000 hours of deliberate practice on their instrument by age 20 and exhibit an extremely fine degree of tactile sensitivity
- Cross-modal feedback and sensitivity to sound differentiation to a similar degree in relation to touch as well as highly developed spatial organization creates a hyper-plasticity far more diversified and complex
- This hypersensitivity and hyper-plasticity is demonstrated throughout the body, in areas remote to those directly involved in playing, suggesting that the plastic restructuring occurs throughout the brain
- This may lead to "confusion of somatosensory inputs produced by expanded somatosensory receptive fields" due to high-level musical instrument training over many years and affects the majority of musicians
- Chronic pain sufferers who are non-musicians experience some similar changes due to pain input over time

Florence C. F. Chang and Steven J. Frucht (January 2013). *Motor and Sensory Dysfunction in Musicians' Dystonia, Current Neuropharmacology*

- Instrumentalists who develop dystonia have been shown to exhibit traits of hyper-plasticity, increased cortical excitability, abnormal inhibition, and difficulty with sensory integration in other parts of the body unaffected by the dystonia, indicating that these changes are present throughout the brain and nervous system
- The first record of musicians' dystonia comes from the diaries of Robert Schumann in 1830
- Near-perfect accuracy and the practice required to produce such targeted spatial specificity has been shown to alter plasticity in the cortex
- Instruments that require higher spatial demands such as violin, viola, piano, and guitar, have a higher rate of dystonia development
- Brass players who develop embouchure dystonia experience changes in cortical mapping in relation to the lips and tongue
- Dystonia can spread to the unaffected hand or parts of the jaw, face, neck, spine through faulty surround inhibition
- Musicians with dystonia demonstrate reduced movement related cortical potentials, meaning that even small movements, once signaled in the brain, are nearly impossible to stop or reverse, even at or just before the moment of initiation

B. Risk Factors for Injury Specific to Musicians (documented in studies 1980-2015)

- Ergonomic challenges--little variation in neck and trunk for long periods; static and or dynamic shoulder loading; repetitive or loaded wrist flexion and extension; dynamic finger movement

- Training in competitive environments, often since childhood, where standards of proficiency must be regularly achieved and maintained
- Long practice hours - to maintain an elite level of playing, instrumental musicians play one instrument an average of 1300 hours per year; practice involving intense self-scrutiny and repetition, approaching physiological, neurological, psychological limits
- Pressure to perform consistently well on a weekly basis for job security
- Connection of these injuries to necessary function and livelihood
- Training based on tradition and sound rather than physical and other considerations
- String players ranked first, followed by winds, then low brass
- High level of self-consciousness relates to performance anxiety and to attention to physical symptoms
- Memories of "bad" performance experiences, especially as young adults

C. Why do instrumental musicians continue to suffer high rates of pain and injury?

- Difficulty evaluating using standard physiotherapy tools because injury is often the result of "hyper-functioning" – increase in size, strength, and range of motion problems often not diagnosable with standard clinical assessment
  - Increased left-arm supination in violinists and violists
  - Right arm dynamic variability in cellists
  - Shoulder development in trombonists
- Lack of research into the specific nature of these injuries in musicians as different from musculoskeletal injury in the general population
- Therapeutic measures currently offer stretching, periods of time away from the instrument, pain medication, but do not address these kinds of changes in the brain and nervous system
- Poor understanding of neurological factors in both medicine and pedagogy--cortical reorganization is demonstrated through studies of musicians affected with neurological disorders
- Diagnosis is often delayed due to difficulty understanding the disease and accompanying complaints
- Many musicians choose self-management of both physiological and psychological issues

V. My Pedegogy—What I do and what does Feldenkrais have to do with it?

A. Learning how to learn
- Your instrument as a tool for experiential learning
- Discovering the instrumentalist inside you from the inside out—becoming your own best teacher
- Never stealing an opportunity to learn—the challenge of keeping the answers to yourself and asking questions, and allowing yourself to be wrong and the student to be right

B. Awareness Through Movement
- Thinking, Feeling, Sensing, Moving—the concept of integration in learning
- Why Movement? Why we use movement to explore everything else, and how I incorporate movement into instrumental pedagogy

- Developing the self-image—recognizing and clarifying new parts of ourselves
- Working with developmental concepts and play—play is learning, and can also create recognizable analogies to fundamental concepts particular to the instrument; I always go for the familiar when working on a new technique
- Variation and choice—providing new tools, but not overwhelming,
- Intention and initiation—the need to connect to actual function on the instrument; using small distinctions to make connections to function directly on the instrument
- Embodiment—integrating the whole mind/body and all of the senses into the action, including, breath, posture, power, balance, everything that makes up the self-image to serving the music itself

D. Working with large groups

- School clinics
  - Providing some kind of movement away from the instrument
  - Asking questions, letting the group lead the direction of the learning
  - Finding something new in each lesson

- Feldenkrais-specific workshops
  - National Association of Schools of Music requirements for accreditation in the United States
  - Addressing the demographic—my wonderful experience with the students Texas A&M University, Kingsville
  - Addressing the individual interests of faculty and students
  - Building an interest in further exploration over time—asking questions, challenging puzzles in ATM work, challenging ideas and traditions of learning, leaving these questions open-ended and not coming to conclusions/answers

- Summer festival work
  - Weekly or daily ATM classes—exploring movement in detail away from instrument has proven very successful in lowering the rate of injury over the course of these intensive summer programs; many students have talked about doing parts of these lessons on their own during the year
  - Instrument specific workshops—working with faculty to devise lessons around playing issues and bringing into functional application—I have done brass and woodwind workshops each of the past 4 summers
  - Encouraging individual questions—I find that addressing a group with a broad range of leaning needs in ATM classes helps students begin to identify their individual learning needs and brings them forward with specific questions for application; opening the door to these kinds of questions is the first step in learning how to learn

E. Working with all ages

- Suzuki workshops, and little ones—ages 3-10, critical formation
  - Developmental play—filling in the gaps to make instrumental playing easy and fun
  - It's all play! Animals, balancing acts, pretending to conduct, tongue twisters

    - Involving the parents in this kind of learning, assisting, playing along, explaining developmental concepts and their connection to the demands of instrumental playing

- Middle school and high school students—ages 11-18, creating a foundation
    - Learning how to ask questions of themselves in practice
    - Not needing to find the right answers, only to hone the questioning ability
    - Discovering the inside out way of learning; how is it different from some of the learning they do in school
    - Developing a relationship with music and their instrument that is individual and sustaining—trusting in this interaction
    - Listening—to your instrument, to yourself

- University and graduate music students—ages 18-whenever!
    - What you already know—how to question and reevaluate throughout your career so that change is always possible
    - Practicing to grow, not to maintain
    - What you don't know you don't know—exploring the most direct path to learning

VI. Some Questions for Further Exploration

- How can anecdotal information in cases like mine and others play a role in the research of dystonia?
- Is it possible to evolve in our understanding of the Feldenkrais Method by exploring the full range of individual experience?
- Can evaluating various applications of our work in the Method provide alternative ways of working with musicians and provide insight into ways of preventing and recovery from injury?
- How do various groups or individuals in specialized professions respond differently to elements of this work? What are these?
- How can we improve our communication work with clients/students to create options/language/openness for the communication of serious concerns and difficulties?
- How can we as a community develop respect for the varied potential that this work holds without fear?

Thank you! Please contact me with any additional questions and/or ideas using the email above. Of interest is also a recent publication in the 2015 Journal of the North American Feldenkrais Guild found at http://www.feldenkrais.com/journal-burrell-rubin-rep, and my ongoing blog at wordpress.com.