

THE REDUCTION OF MUSCULAR EFFORT:  
A KEY TO MUSIC LEARNING AND  
PERFORMANCE EFFICIENCY

BY

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**INTRODUCTION**

In the award-winning film "From Mao to Mozart," there is an unforgettable scene in a master class where Isaac Stern intently listens to and paces around a young Chinese violinist. Suddenly he asks the young woman to stop playing. Stern reaches under his shirt, removes the piece of foam that he uses as support for his violin and arranges the pad for the student. When she resumes playing, there is such a marked improvement in tone that the entire audience bursts into applause. Stern has swiftly and clearly demonstrated how to enhance musicianship by reducing the amount of effort needed to play.

Not only does unnecessary physical effort detract from artistry, as in this example, it also contributes to a host of neuromuscular and musculoskeletal problems that are widespread even among world class musicians. Many renowned pianists have sought out muscular relaxation and retraining methods to help correct problems with their hands. Professional musicians frequently complain of tendinitis in the arms or hands, chronic neck and lower back trouble and other problems that may vary with the instrument played. Unnecessary effort in playing creates bodily strains and stresses that over a period of time can prevent the musician from performing with enjoyment and ease.

How do these patterns of unnecessary effort become a habitual aspect of playing? To answer this we need to define the issue more precisely. Once that

is done we can arrive at some practical solutions that will help the music educator effectively assist the student in combining greater skill with reduced effort. What we discover through our inquiry will also assist the musicians themselves in attaining greater efficiency and elegance in playing.

## **LEARNING IN ACTION**

The act of making music, like any other action, requires muscular effort. Simply stated, muscles contract as a result of messages sent by the nervous system. By acting through their bony attachments, the contraction and relaxation of muscles move the skeleton. Our movements are generated by intention, and through feedback from the body and the environment, including information from the eyes, ears, skin, muscles and joints we are able to alter our movements to successfully achieve our purpose.\*

Except for a few basic functions, such as coughing or blinking, all human action is the result of a learning process. Actions peculiar to human beings, like walking, speaking, and playing a musical instrument, require a lengthy apprenticeship.

The first requirement for learning is the intention to do something new, whether it be crawling for the first time or tackling a new concerto. Learning proceeds through a process of trial and error, wherein we experiment to find the pattern of movement most successful in realizing our intention. As this pattern is repeated and made familiar it will gradually become automatic. For instance, in learning to play a piece of music we must find our way towards achieving the desired tone, rhythm, dynamics and interpretation. Fundamentally, this is a process of establishing a pattern of discrete movements while also eliminating unwanted superfluous effort. How are we able to make the sensory distinctions necessary for eliminating

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\*For a brief introduction to the physiological basis of musicianship, see Dr. Frank Wilson's paper, "Mind, Muscle and Music."

superfluous effort? Consider that while we can hear a pin drop in a quiet room, we might miss the sound of a falling chair in a noisy restaurant. In other words, the greater the background noise the less we are capable of hearing subtle or small sounds. This is a physiological phenomenon that we know holds true for most of our senses. It is therefore reasonable to suppose that the more we reduce the muscular effort or "noise" in an action, the greater should be our ability to feel and sense what we are doing. Thus, the intentional reduction of effort may be a means to optimize the musician's ability to learn.

### **EFFICIENCY IN ACTION**

In the biographical movie "In My Life," the great Artur Rubinstein is seen practicing at his piano. He turns to the camera and says, "...the difference between myself and other pianists is the lack of effort in my wrists." All music educators and musicians understand the desirability of effortless playing. We have postulated that reduction of muscular effort can sharpen sensory acuity. We will now see how this might also lead to improved efficiency in action. But first, we will describe what we mean by efficiency.

We can describe ideally efficient movement as displaying the following essential ingredients:

1. The entire muscular organization of the person should be coordinated and integrated in the intended movement. This means that the eyes, head, neck, torso, arms, pelvis, legs and feet all work together. Conversely, any part of the body which is not involved or coordinated with the whole is actually impeding maximum efficiency in action.
2. Force should be transmitted through the skeleton in the most direct way. This means, for example, that in good body usage the skeleton should support the body's weight in such a way as to minimize the work of the

muscles. When striking the keys of a piano, force should travel from the trunk through the shoulders, arms, wrists, hands, and fingers through the most economical route. This is the essence of "good form."

3. The large muscles of the body should do a proportionately larger share of the necessary effort relative to the smaller muscles. This frees the latter for the delicate and precise sensing and execution required to play a musical instrument. We can compare the muscles of the body to the strings of a harp; when the muscles are doing work proportionate to their size, the body instrument is in tune.

Efficient movement organization embodies all these aspects. Thus the musician is able to perform with the minimum expenditure of energy and the maximum awareness of him or herself and the music.

#### **PUTTING THE IDEAS INTO ACTION**

The theoretical principles of efficient learning and action that we have been discussing are applied in a unique educational method developed by Dr. Moshe Feldenkrais of Israel. This system has been widely used by music educators and musicians in Israel and Europe. Yehudi Menuhin and Igor Markevitch are two of its most notable proponents. A growing number of people in the music world believe that Feldenkrais' work is of major value to musicians, both as a means to artistic excellence and as a method of learning efficient, stress-free body organization.

The program we have developed, based on Feldenkrais' work, consists of a system of movement lessons through which one learns to increase sensitivity to minute muscular and skeletal events. This heightened awareness serves to minimize the effort of moving. Through a process of self-discovery one becomes aware of many parts of the body and the aspects of movement of which we are normally unconscious. This allows the entire body to become harmoniously involved in the

act of playing. One also learns to kinesthetically imagine movements in order to develop the valuable talent for mental practice. In addition, the lessons improve all the specific motor skills that are foundational for the highly differentiated movements required of the musician.

### **A DEMONSTRATION OF LEARNING IN ACTION**

In order to provide a concrete experience of our program we will now present an abbreviated lesson. The following exercise can be done in a period of 15 minutes while sitting in a simple straight chair or on a piano bench.

Please do this lesson in a quiet environment where there will be no interruptions or distractions. During the lesson it is important to do each movement very slowly, taking time to pause between each movement and resting whenever you care to. This is not an exercise! Never go to the limit of your range of motion, but rather do less than you can, staying within the range of what is most comfortable for you. This is not stretching! Remember that the more you reduce your effort, the greater will be your ability to sense and let go of any unnecessary muscular work. Put aside the Puritan Ethic; the smaller your effort the greater will be your reward.

*Please sit on the front edge of the left side of your chair in such a way that only the right buttock is on the chair. Place the feet so that the whole foot makes contact with the floor. Place the left hand on the left knee and the right hand flat on the chair a few inches to the right of your right buttock. The right hand is now slightly supporting you.*

STEP 1. *Simply and easily turn to the right and notice what point in the room is directly opposite to your nose. This point represents how far you can easily turn to the right before embarking on the lesson. Come back to the original position.*

STEP 2. Without staring, fix your eyes at a point on the wall directly in front of you, at what would be the level of the horizon. Keeping your eyes fixed on this point, slowly turn your head and upper body to the right just as far as it is easy. Now return to the middle, and pausing between each movement, repeat the turning to the right about ten times. You will find that you are not turning as far as when the eyes moved with the rest of the body. This is because the eyes and head are not fully participating in the movement. If you find any difficulty in keeping the eyes stationary, do an even smaller movement and do it more slowly. After doing the movement a few times in this way, you will be surprised to discover that what was impossible a minute ago is now easy.

STEP 3. Repeat step number one and see how far you turn to the right. Notice if there is also a difference in the feeling of effort and other qualities of movement. Rest.

STEP 4. Keeping both the eyes and head fixed in the middle, slowly turn your shoulders to the right and then back to the middle about ten times. Reduce the effort in the movement so that each one will feel lighter and easier. Do not concentrate your attention. Allow your awareness to move throughout your body, letting go of unnecessary efforts as you discover areas of holding. As you turn your shoulders, notice what is happening in your neck, chest, pelvis, legs and even your toes.

STEP 5. Repeat step number one and see how far you now turn to the right, and notice the difference in movement quality. Rest.

STEP 6. Move the left foot backwards about twelve inches to a position where you can lean on the toes and ball of the foot, leaving the heel in the air. Now direct the left knee in a small, slow movement forward

STEP 12. Now return to the original position of Step 1, with both feet flat on the floor, and turn your entire self to the right, just as you did at the beginning of the lesson. Notice the remarkable improvement in the ease, range and quality of your ability to turn. This has all be gained in only a few minutes. You may be able to now turn 180 degrees or more around yourself.

STEP 13. Now sit with both buttocks on the chair and both feet flat on the floor. Feel how the contact of the left sit bone on the chair is noticeably different from the other side. Do you feel you are sitting more on one side? Make one slow, easy movement of turning to the right and then to the left, so that you can compare the two sides and distinguish what has been learned on a sensory-motor level. What other differences can you detect between the left and right sides of your body? In your face, eyes, shoulders, legs, feet, etc.? Now stand and slowly walk, again examining the feeling of lightness on the left side. Now would be a good time to go to your instrument and play. Notice subtle changes in the qualities of your movements and your ability to sense and feel.

#### **DISCUSSION OF THE LESSON**

The condensed lesson you have just completed is an example from a large series of physical and mental exercises. This one dealt with the function of turning, one of the most basic movements in ordinary life and an important aspect of good movement organization. Lessons have been created that cover a wide range of human physical activity. For example, there are lessons concerned with efficient breathing, sitting, standing and walking, as well as those that foster increased flexibility and coordination of the neck, shoulders, spine, pelvis and legs. There are



also more specific exercises that bring about refined skill in the use of the eyes, lips, tongue, jaw, voice, hands and feet. Now only does the method enhance musculoskeletal efficiency in movement, it also integrates the more subtle dimensions of rhythm, balance, mental practice, spatial orientation and body image. For example, we often work one side of the body at a time, as in the above lesson. This cultivates sensitivity by producing contrasting sensations on the two sides of the body. Typically we perform the movements on the second side in the imagination only. This acts to further improve our kinesthetics and helps to develop the capacity for mental musical practice.

In the first part of this paper we suggested how the reduction of muscular effort in the movement might optimize both one's ability to learn and one's mechanical efficiency in action. In the exercise presented above, a reduction in effort was brought about by emphasizing awareness rather than achievement, quality rather than extent of movement and the slowness required for attending to sensation. The improvement in turning to the right brought about by the lesson was not the result of stretching muscles or of mere repetition; it resulted from proceeding in a way designed to facilitate the discovery of new possibilities of perception and modification of movement. This orientation creates conditions that facilitate the sensory-motor learning so necessary for mastering a musical technique.

### **DIFFERENTIATION IN ACTION**

In a newborn infant there are relatively fixed patterns of movement involving the head, eyes and arms. Therefore, independent movement of these members is very rare. As the infant grows it is increasingly able to separate the movement of the head from the arms. This development of independent control of body parts is what we call *differentiation*. The older the child becomes the more it is capable of performing complex differentiated movements such as moving the eyes

independently of the turning head, or the fine discrete movements of the fingers needed to play a musical instrument.

The differentiation between the right and left hand that is required to play music is comparable to learning to move the head and trunk in opposite directions as we did in the example lesson. In any activity where high levels of skill are demanded we will see that certain functions are highly differentiated. Significantly, musicians must differentiate the movements of the fingers, mouth and aspects of breathing much more than non-musicians. Despite these special accomplishments many parts of the musician's body remain unclarified and undifferentiated. It is perhaps because musicians focus their attention on the more obvious articulated movements that there is a tendency to overlook the contribution of the rest of the body. Thus we propose that many of their inefficient habits and chronic ailments result from unnecessary muscular effort in these underdeveloped and unintegrated parts. Our program is based on the premise that the musician's highly refined and specialized awareness of certain aspects of the self in action can be effectively utilized to bring about integration of the entire body in the act of playing music. Thus we can see how in the example lesson a progressive generalization of attention was used to include more and more parts of the body in the movement of turning.

### **BENEFITS OF THE PROGRAM**

Most of this paper has been concerned with the theory and practice of efficient learning and action. Dr. Moshe Feldenkrais has always maintained that this method is above all about "learning how to learn." We therefore believe that it makes a major contribution to music education by providing a better understanding of the learning process. This allows us to better create the optimal conditions for learning music. This unique learning system also helps musicians to acquire the good habits of body organization necessary for efficient playing.

Michael Brickey, a French horn player and teacher who has studied with Dr. Feldenkrais, has stated that "these sophisticated strategies for differentiating and improving awareness easily generalize to musical skills. Notably, the amount of effort of doing what I already did well was reduced and I felt an ease of playing I had never enjoyed. This included improvement in breath capacity and support, better embouchure control and endurance, greater ease of sitting and holding the horn and an increased awareness and ability to deal with expressive details."

Although we have only briefly touched upon the specific physical complaints that are pervasive among musicians, much of our work is directly concerned with alleviating these problems through movement re-education. Yochanan Rywerant, an Israeli teacher of Dr. Feldenkrais's method has published two papers on his work with musicians. One is an account of a young conservatory piano student who suffered from pain in her neck, arm and wrist associated with playing. He describes how, after a series of lessons, she was able to play not only without pain or fatigue, but also with increased efficiency and self-confidence. The second paper is a dramatic story of the rehabilitation of Hanoeh Tel-Oren, the principal flautist with the Jerusalem Symphony Orchestra, whose right arm and hand were severely injured by a terrorist bullet on March 11, 1978. The medical prognosis was that Tel-Oren would never play his flute again due to the extensive nerve damage. Despite this gloomy prediction, he embarked on an intensive series of individual lessons. On March 20, 1979, he was able to successfully return to the concert stage. The musical reviewer for the Jerusalem Post wrote, "To hear a fine musician restored to this faculties after the terrible terrorist ordeal was an uplifting human and musical experience, and Hanoeh Tel-Oren received a richly deserved warm reception." The story of Hanoeh Tel-Oren is, of course, an extraordinary example of the potential benefits of the method.

## CONCLUSION

We have found that many of the complaints of musicians are related to their inefficient physical habits. We suggest that improved kinesthetic discriminatory skills can often alleviate these problems. We also firmly believe that by more fully integrating all parts of themselves into the act of playing, musicians can expect to realize more of their full potential.\*

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\*Although this paper has expressed a primarily physical view of musicianship, we are nonetheless very concerned with matters of aesthetics and self-expression. These issues are discussed in detail in our forthcoming book.

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