Musical Medicine

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A study published last June in *Circulation: Journal of the American Heart Association* revealed that blood pressure, heart rate, and breathing rate are all dramatically impacted by music. The study, conducted in Pavia, Italy, took 24 healthy adults between the ages of 24 and 36, and monitored their physiological reactions to different passages of classical music. The selections, which the subjects heard through headphones, included a Bach cantata, parts of Beethoven's Ninth Symphony, "Libiam Nei Lieti Calici" from the opera *La Traviata*, an aria from Puccini's *Turandot*, "Va Pensiero" from the opera *Nabucco,* and two minutes of silence.

Essentially, the study subjects' cardiovascular systems were seen to "synchronize" with the music. Researchers found that musical crescendos (a gradual swelling of volume and tempo) consistently triggered higher blood pressure and faster breathing and heart rates. Decrescendos (a softening of the music) produced lower blood pressure, and slower heart and breathing rates.

Lead researcher Luciano Bernardi, M.D.stated that the findings "increase our understanding of how music can be used in rehabilitative medicine." Dr. Bernardi believes that music "rich in emphasis" like opera and "alternating between fast and slow music" may prove particularly effective for helping stroke patients.

Musical Stroke Therapy

In fact, *music therapy* is already employed in several ways to help stroke patients regain motor and communication skills.

Some stroke victims who cannot talk can still sing, because singing and speaking utilize different parts of the brain. Placing common sentences such as "Good morning, how are you?" into a familiar tune, and then encouraging patients to sing the words, can stimulate speech recovery. "Singing rehearses the speech element in the brain to become functional," explains Concetta M. Tomain, executive director of the Institute for Music and Neurologic Function, and vice president of music therapy at Beth Abraham Family Health Services in New York. Music therapists set conversational phrases to well-known melodies, and then eventually "remove" the tune, leaving behind normal speech. This particular treatment technique, known as *melodic intonation therapy,* was originally developed by doctors at Boston Veterans Affairs Hospital in 1973.

During music therapy, stroke patients also use instruments, such as drums, to communicate thoughts and feelings. In addition, music therapists make use of special software called MIDI (Musical Interface Digital Instrument) which, together with therapeutic physical devices, helps people with limited mobility to play and compose music.

Music therapy also addresses motor skills. Stroke victims gradually regain control over muscles, as therapists guide them in matching musical tempos to their movements. Musical rhythms help many stroke patients relearn to walk.

The emotional benefits are tremendous. Music energizes patients, helps them to relax, and alleviates anxiety and depression. According to the American Music Therapy Association (AMTA), simply participating in musical activities can lower blood pressure.

Though music therapy may seem esoteric, it has been practiced for decades, even before the establishment of AMTA in 1950. Over the last few years, numerous clinical studies have underscored its effectiveness, the Pavia, Italy study being merely the most recent.

Recovery of Vision

Remarkably, research conducted at Imperial College London in early 2009, sponsored by the UK's National Academy of Sciences, indicates that listening to enjoyable music may also help stroke patients to recover lost vision.

Most stroke victims lose a portion of their eyesight, due to a condition known as "visual negelect." While a stroke does not directly damage the ocular nerve or any of the mechanisms of the eye, it often affects areas of the brain that integrate visual stimuli. Therefore, stroke victims can no longer identify or track objects in certain regions of their visual field.

The UK study took three stroke victims who had lost half of their visual field. These patients were given tasks to do under three conditions: listening to music they liked, listening to music they did not like, and silence. The researchers found that the study subjects were able to identify shapes, lights, and colors on the "missing" sides of their visual fields with far more accuracy while they listened to music that they liked. One patient in particular could identify light on his "depleted" side 65% of the time while listening to his favorite music, but only 15% of the rest of the time. All of the patients were able to perform their tasks much more successfully while listening to their preferred music.

The researchers concluded that positive emotions generated by music may strengthen the efficiency of signaling in the brain, along with the ability to process stimuli. Lead researcher Dr. David Soto stated, "Music appears to improve awareness because of its positive emotional effect on the patient, so similar beneficial effects may also be gained by making the patient happy in other ways."

Other Seminal Studies

A study conducted by neuroscientists at Helsinki University in Finland, published in the journal *Brain* in February 2008, revealed that listening to music for a couple of hours each day helps stroke victims recover verbal memory, lengthens

their attention spans, strengthens their ability to pay focused attention, and reduces depression and confusion.

The Finnish study followed 54 stroke victims, with an average age of just under 60, for a six-month period. During this time, one third of the study subjects listened to music they liked for at least two hours a day, another third listened to audio books each day, and the remaining third did neither. At the end of the six months, the patients were given a battery of cognitive and psychological tests. The music-listening group showed highly significant improvements in all categories of cognitive functioning and psychological health, much more so than the other groups.

Lead researcher Teppo Sarkomo, Ph.D.suggests that the startling benefits of music may be related to the production of dopamine, which is the pleasure hormone in the brain and a neurotransmitter. Previous neurological research has linked increased dopamine with heightened memory, attention, and alertness. Dr. Sarkomo also believes that music may directly stimulate damaged areas of the brain.

Another study, conducted in 2008 at the University of Maryland School of Medicine, and sponsored by the American Heart Association, the Veterans Administration, and the National Institutes of Health, found that listening to pleasurable music increased study subjects' blood flow 26%. By contrast, listening merely to "pleasant sounds" increased blood flow 11%, and laughter increased blood flow 19%.

Meanwhile, many hospitals now play music for premature babies in the neonatal wards. Studies indicate that music can calm the infants, encourage better oral feeding, stimulate faster weight gain, and minimize pain. *Archives of Disease in Childhood* has reported that music also has a positive effect on infants' heart and breathing rates.

Getting the Benefits of Music

Obviously, listening to music that you like is good for you. Many studies have shown that there are significant physiological benefits associated with enjoying music, including enhanced ability to fight infections, an increase in the brain's natural painkillers, and the release of "bonding hormones" associated with feelings of trust.

Some health insurance programs cover music therapy. Since 1994, music therapy has been recognized by Medicare as a reimbursable treatment, though it must be prescribed by a doctor. If you are interested in music therapy for yourself or a loved one, for stroke rehabilitation or any other condition, inquire with your doctor. You can also contact the American Music Therapy Association (www.musictherapy.org) to find music therapists near where you live and learn more about treatment.