Music & Rewiring the Brain with Neurologic Therapy

By Greta Burroughs

The healing power of music has been acknowledged since ancient times. Philosophers such as Plato, Aristotle, and Confucius wrote about the soothing effects of music to bring a person's mental and physical well-being back into balance and in harmony with nature. Little did they know their observations would eventually blossom into a scientifically based branch of rehabilitative medicine called "music therapy."

This philosophical precept has been forgotten during the evolution of medical science, which relied more on medicinal cures over holistic practices. Having cures for previously fatal ailments changed our focus from old-fashioned natural remedies to the more convenient "magic pills" dispensed by doctors. Of course, the drugs and medical procedures we have today are invaluable to the treatment of many diseases, and disabilities. Prolonging the lives of our loved ones is a good thing, but why not supplement traditional medicines with complementary therapies to aid in healing?

This question has led to extensive research and has brought us back full circle to the healing power of music. Initial research in music therapy has shown that music can bring about:

- Positive changes in attitude, mood, and emotional well-being
- A feeling of being more in control of life
- Greater awareness of self and environment
- Reduction of anxiety and stress
- Drug-free management of pain and discomfort
- Increased social interaction

"The power of music to integrate and cure... is quite fundamental. It is the profoundest nonchemical medication." —Oliver Sacks, "Awakenings"

But it does not end there. Over the past fifty years or so, music therapy research has brought about new innovations and knowledge focusing on how music can be used to rewire the brain to help people with neurologic injury or disease.

Neurologic Music Therapy (NMT) combines music with neuroscience to provide a pathway for people with cerebral palsy, autism, multiple sclerosis, Alzheimer's, Huntington's, and Parkinson's diseases, as well as stroke and brain injury patients to regain gross and fine motor functions, speech and language skills, along with memory and cognition.

At the forefront of neurologic music therapy research is the Institute for Music and Neurologic Function (IMNF), imnf.org/, co-founded on the works of neurologist and best-selling author, Oliver Sacks, MD, CBE, FRCP, in partnership with another pioneer in the field of neurologic music therapy, Concetta Tomaino, DA, LCAT, MT-BC.

In the 1960s, Oliver Sacks observed how rhythms could animate and bring movement to people with a specific type of Parkinson's disease. He noticed that for people with motor disturbances or issues related to motor coordination, the use of rhythm could

actually turn on and stimulate areas in the brain through pulses of sound or the rhythmic patterns of sound. Sacks saw the potential for rhythm to animate and bring life back to his patients and to help others.

Concetta Tomaino's journey started in 1978, working with patients dealing with end-stage Alzheimer's disease. She observed that people who had severe cognitive loss and were unable to recognize anyone or anything responded to familiar music. She says, "Over the years, I have studied the effects of using music mnemonics and other music tools to help people in the early stages of Alzheimer's disease to enhance their memory function. The institute was founded in 1995 to help support my and Dr Sacks' work and to train other people to implement these science-based music techniques.

"The IMNF has also created a clinical practice so we can provide in-home and in-clinic music therapy services. The scope of what we do includes all neurologic conditions, so people with strokes, or those who have lost their speech due to brain injury, as did Congresswoman Gabby Giffords, can regain their speech through music therapy."

Concetta Tomaino went on to say they have successfully used certain types of singing patterns to help those who have lost their ability to find words utilizing parts of the brain that are still functional. Eventually, their patients are able to regain normal speech again.

Techniques have also been developed for movement disorders such as multiple sclerosis, cerebral palsy, and Parkinson's disease. It has been shown through neuroscience how the brain becomes stimulated and organized through sound.

"Since neuroscience has devoted a subgroup to cognition, music, and circuits in the brain, we have started to get answers for why musical applications work so well," Tomaino states. "This is what's exciting to me because soon the public will know music is not just a feel-good thing used to pass the time when you're disabled. But it is something that can help; not only to maintain function but also to restore it."

The research in neurologic music therapy is ongoing with the knowledge gained being put into action by therapists around the globe. Individualized programs are developed according to each person's specific needs with fascinating results in patients after only a few sessions.

"The magic of "musical medicine" will come into its own. The application of such healing potencies will not be limited to man's body and mind. It will be an agency for building and healing his soul as well." —Corinne Heline (1882-1975)

Brian Harris is a Neurologic Music Therapist Fellow and board-certified music therapist with a passion to help everyone he can. His first exposure to the benefits of using music therapy with clients happened when he was

Fine motor NMT. Sean Manning works with MedRhythms' lead therapist, Caitlin Hyatt on his fine motor skills. Manning explains that activities such as playing varying sequences on the keyboard, tossing and catching shaker eggs with his left hand, and ringing bells with his left index finger have greatly improved his fine motor skills and coordination.

serving as an intern while attending college.

Harris' mentor was working with an eighteen-year-old male who was physically and cognitively functioning at a one-year-old level. "Within ten minutes of using music with this boy, he was functioning at a higher level cognitively than anyone had ever seen before. It was at that moment I decided this was my calling in life."

Harris goes on to explain, "Even though this was beautiful to witness, I knew there had to be a reason why this boy responded to the music from a neurologic perspective. If we could figure that out, then we could really harness the power of music and replicate it to help other people." That was the beginning of Harris' journey to understanding the neuroscience behind NMT and applying it to his work.

What exactly is neurologic music therapy? Harris defines it as an individualized intervention based on the neuroscience of music, utilizing music to improve function in the areas of movement, speech and language, and cognition. "We help people recover these functions following any neurologic disease or injury—anything from Parkinson's disease, Huntington's disease, multiple sclerosis, cerebral palsy, Alzheimer's, autism, traumatic brain injury, and stroke—all across the spectrum."

Harris' journey has led him to discover that using NMT worked better than just using traditional therapies alone. People got better faster with greater results, and sometimes the music was the only thing that worked. But there was more need for the services of NMTs than available therapists. After receiving neurologic music therapy in the hospital, few options were open for patients to continue as an outpatient or at home. The solution—Harris started a company named MedRhythms, medrhythms-therapy.com, to meet that need and help as many people as he could.

"Our company treats everyone from a ten-month-old child to our oldest client who is in his nineties. Most of our sessions are from thirty minutes to an hour, depending on the person's tolerance level. Most of the time, we can see a change in someone's function within the first session. However, frequency and consistency are important factors in order to see long-term functional change without music."

When Sean Manning first started receiving neurologic music therapy, he could not walk or move his left arm. He had suffered a hemorrhagic stroke at the age of twenty-two, resulting in the left side of his body being paralyzed. NMT began while he was in Spaulding Rehabilitation Hospital (Charlestown, MA). His therapist was Brian Harris, and their first priority was regaining the ability to walk. Through music, Manning retrained his brain and his body to respond to a rhythmic beat, taking steps in time with the music. Within two to three weeks, Manning was walking without a brace or cane.

It has been a couple of years since his first therapy session, and now Manning lives independently and is self-sufficient. He still undergoes weekly outpatient music therapy sessions with Caitlin Hyatt, lead therapist at MedRhythms, to fine tune his gross and fine motor skills. He says, "We've focused on various things since my stroke. At first, it was just walking for the most part. Then we worked on gross arm movement. As it recovered, Caitlin and I moved on to fine motor skills in my left hand."

He explains that activities such as playing varying sequences on the keyboard, tossing and catching shaker eggs with his left hand, and ringing bells with his left index finger have greatly improved his fine motor skills and coordination. "Now as a result of neurologic music therapy, I'm typing again."

The young man adds, "I'm a huge proponent of NMT. It helped me incredibly. It's really awesome stuff. It's made a big difference in my life."

Fifty years ago, neurologic music therapy was just a theory. Through research and practical application, it has become a science. Even so, many people, including medical professionals, are unaware of its existence. But things are changing; the future looks bright for neurologic or brain injury patients interested in obtaining more information about neurologic music therapy.

Concetta Tomaino says the National Institutes of Health (NIH) and the National Endowment for the Arts at Kennedy Center in collaboration with the American Music Therapy Association have announced a real effort to support and bring to the public awareness the importance of neuroscience research, music, and the brain, as well as the importance of therapeutic applications of music to affect potential rehabilitation and recovery.

Brian Harris has traveled the world doing presentations about NMT for

"Eventually, music therapists will compose prescriptions after the manner of a pharmacist."
—Ira Altschuler, MD, of the Eloise State Hospital (1942)

people both inside and outside the field of music therapy. He is working on spreading the word to healthcare and medical organizations that would not normally hear the message. Also, at MedRhythms, they are building digital medicine technology so they can take the neuroscience of music and turn it into hardware and software that replicates some of the things they have been doing as clinicians. Through technology, more people will be able to take advantage of the wonderful benefits of neurologic music therapy.

The healing power of music has been known since the time of ancient civilizations, however, now, combined with science, music is helping more people and benefiting more than the Greeks Plato or Aristotle may have dreamed possible. Only time will tell what further benefits will unfold in the fascinating field of neurologic music therapy. Δ

Greta Burroughs enjoys learning new things by researching and writing about interesting topics people may not be familiar with currently. She is always on the lookout for the stories begging to be discovered. https://gretaburroughs.weebly.com.

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Gross Motor NMT. After his stroke, Sean Manning retrained his brain and his body to respond to a rhythmic beat, taking steps in time with the music. Within two to three weeks, he was walking without a brace or cane. Since then, Manning continues to work on his gross motor skills with his therapist, Caitlin Hyatt.

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To Find an NMT:

- There is a registry of board-certified music therapists including people who specialize in NMT on the Certification Board of Musical Therapists' website www.CBMT.org
- The Academy of Neurologic Music Therapy has a world-wide registry of NMTs at https://nmtacademy.co/home-2/

Feature films and documentaries based on Neurologic Music Therapy inspired by the work of Oliver Sacks, MD, and Concetta Tomaino, DA, at the Institute for Music and Neurologic Function.

- *Awakenings* starring Robert DeNiro, Robin Williams, Julie Kavner, and John Heard
- *At First Sight* starring Val Kilmer, Mira Sorvino, Bruce Davidson, Nathan Lane, Kelly McGillis, and Steven Weber.
- *The Music Never Stopped* starring Lou Taylor Pucci, Julia Ormond, JK Simmons, and Cara Seymour.
- *Musical Minds* a one-hour Nova documentary on music therapy on PBS.