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MUSIC THERAPY: A Different Kind of Beat

By Katherine Goforth Elverd, MM, MT-BC, NICU MT and Martha Summa-Chadwick, DMA

People depend on music every day to enrich lives, enhance special occasions, entertain minds or encourage muscle movement. The language of music notation incorporates technical elements such as dynamics, tempo and key signatures. These elements become an enchanting fusion when written notes become sound. When all of these elements are combined with therapy, a whole new beat is created – music therapy.

Music therapy, as defined by the American Music Therapy Association, is the clinical and evidence-based practice of music interventions to accomplish individualized nonmusical goals within a therapeutic relationship, by a credentialed board-certified music therapist (MT-BC). Music therapists are familiar with multiple genres of music, such as children's, pop, country, rock, classical and jazz. They earn a minimum of a bachelor's degree in music therapy, which includes a six-month clinical internship and successful completion of the national board certification exam.

Music therapy helps patients address goals related to pain management, gait training, focus, memory, communication, social engagement, self-expression, enhancing mood and improving the overall quality of a person's life. These nonmusical goals are achieved through implementing evidence-based music interventions that include creating, singing, moving to and listening to music. As established allied health care professionals, music therapists work in medicine, mental health, rehabilitation, special education, skilled nursing and hospice, with all ages from the beginning to the end of life.

When brain-imaging tools such as fMRI and EEG came into wide use during the 1990s, the path forward for music therapy gradually emerged from social science into neuroscience. Evidence-based research verifies that music helps encourage brain plasticity, resulting in regrowth or re-patterning of

neural networks around damaged or diseased areas for conditions such as stroke and traumatic brain injury. Unfortunately, there are some disorders that affect an area of the brain where plasticity cannot develop. Parkinson's disease is such a condition; the main damage resulting from the disease is in the basal ganglia, where plasticity cannot occur. However, greater quality of life can result from the use of music to assist with motor movement and speech.

An example is found in the work of one of this article's authors. Martha Summa-Chadwick's beloved former piano professor approached her in May 2017 after she delivered the commencement speech at the Hartt School of Music. Luiz de Moura Castro was an extraordinary lifelong concert pianist who began to feel the initial effects of PD in 2005. There was no upper-body dystonia resulting in the hand trembling so typically associated with PD, so Professor Castro was miraculously still able to maintain a schedule of about 20 concerts per year. He began treatment in 2007, but by 2017 his gait was so severely impacted by the disease that he required the help of his wife, Bridget, with most of his daily needs.

Dr. Summa-Chadwick spent an intensive week with Professor Castro in July 2017 to assist with his gait challenges. She suggested they begin a daily regimen of rhythmic auditory stimulation (RAS), a biomedical music technique utilizing an external rhythmic beat with which the client walks in time. The beat is adjusted to match, increase or decrease initial cadence, depending on each client's goal. Both pre- and post-session data are collected to measure changes in cadence (number of beats per minute the individual is walking) and stride length. In a diagnosis of PD, research shows that the most beneficial beat rate is "initial cadence less 10 percent" to eliminate fear of falling and also maximize the effects of slowing cadence and lengthening stride. For example, a PD

client initially walking at 100 beats per minute would begin an RAS session walking to a rhythm of 90 beats per minute.

The external auditory cues would overlay and replace Professor Castro's own diminished automatic motor response, which was severely deteriorated from the PD. Dr. Summa-Chadwick initially used a plain metronome beat rather than music for her former professor. She knew that with his advanced musical background he might start to subconsciously analyze any musical content, and the effects of RAS are greater without additional cognitive interference.

The first day's session initially felt uncomfortable to Professor Castro, but after only a few minutes he had absorbed the ideas and his muscles began to entrain to the new beat. His gait saw substantial temporary improvement each day, with fewer total steps taken as his stride lengthened. He also quickly grasped how using the metronome made all his other motor activities feel "more organized" (his own words). He played a concert toward the end of the week, and his wife was thrilled to report that he'd been able to play his encore without needing her assistance to sit or stand afterward; it was the first time this had happened in over a year.

Mrs. Castro confirms that they have continued using RAS since the summer sessions and are seeing overall improvement in her husband's gait and energy levels. Their relatives in Rio de Janeiro, who saw Professor Castro when they visited in June 2017 and again in January 2018, also commented to her that he was getting around better after he had been working with the RAS for six months.

This narrative presents only one example of how music therapy helps address motor, speech, cognitive and psychosocial goals that extend beyond the initial exposure to the music techniques. Based on current research efforts, there is also potential for music to actively help prevent cognition decline for the elderly or to become an alternate form of pain management to drug therapy in certain medical situations. Music truly has the potential to revolutionize health care.

For more information about music therapy, visit the American Music Therapy Association website at musictherapy.org. To directly contact the authors, please email Katherine at kgoforth27@gmail.com or visit Martha's website at www.marthasumma.com.



Professor Castro works with Dr. Summa-Chadwick using RAS; later that evening he played a beautiful recital.

A	B	C	D	E	F	G
# steps	#seconds	multiplier	CADENCE	velocity	STRIDE LENGTH	
18	9.98	6.01	108.2	15	90.2	1.7
13	10	6.00	78.0	15	90.0	2.3
14	8.12	7.39	103.4	15	110.8	2.1
12	8.5	7.06	84.7	15	105.9	2.5
19	11	5.45	103.6	15	81.8	1.6
15	9.37	6.40	96.1	15	96.1	2.0
15	8.25	7.27	109.1	15	109.1	2.0
13	8.59	6.98	90.8	15	104.8	2.3

Data collected from pre- and post- RAS session with Professor Castro clearly shows improvement in fewer short steps taken (cadence) as his stride lengthened during each session.

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