



# Neurologic Music Therapy Services of Arizona

## NMT and Neurologic Injuries

There are many types of neurologic injuries that can impact ability to function in daily life, including traumatic brain injury (TBI), where damage was caused by an outside force, and other acquired brain injuries such as stroke, near drowning, choking, or tumors. Neurologic injuries can also occur at birth, such as cerebral palsy. Symptoms vary depending on the type of injury, the location, and the severity of damage.

Neurologic Music Therapy (NMT) is an evidence-based treatment model based on the neuroscience of music perception and performance. NMT treatment uses rhythm and music in order to drive changes in the structure and function of the brain and nervous system, thus optimizing how individuals are able to experience and interact with the world around them. Music and rhythm access functional brain connections in order to bypass damaged areas and build alternate pathways.

### Rhythmic Entrainment

Research in the area of motor rehabilitation supports the use of music, specifically rhythm, in the retraining of movement deficits. Rhythm intrinsically cues and organizes movement by providing a beginning and endpoint for the movement to occur, resulting in increased organization, timing, and efficiency of movement patterns. Additionally musical patterns help drive the shape, intensity, and direction of non-intrinsically rhythmic movements.

Instruments can be used in purposeful ways to support a physical exercise, through providing not only a visual target, but also auditory feedback when the target is reached. When these music exercises are shaped inside a rhythmic, musically pleasing, context, the quantity of repetitions and quality of movement increase, resulting in lasting change.



Rhythmic organization can enhance timing, fluency and efficiency of movement.

Learning a new instrument or retraining one known pre-injury can help build new connections in executive function, motor, visual, and language networks



### Cognitive Hierarchy

Neurologic injuries can also impact cognitive function, ranging from arousal, to attention, memory, and executive function. Listening and responding to auditory patterns within a musical context exercises various types of attention, such as sustained, alternating, and selective. Using music as a mnemonic device can be an effective accommodation for learning and recalling information.

Additionally, the complexity of higher cognitive musical exercises, such as learning an instrument, playing in an ensemble, or writing music, allows for activation and integration of networks required for organization, planning, and flexibility.

### From Singing to Speaking

Because language is controlled within a complex neurologic network, neurologic injuries can often negatively impact communication. NMT communication techniques are based on the neuroscientific evidence of shared neural networks (those that produce both speech and singing) and distinct neural networks (those that separately produce either speech or singing). Treatment based on this fact allows the strengthening of existing speech networks as well as the repurposing of alternate networks in order to produce change. Additionally, rhythm is an effective cue for the motor coordination component of speech, improving articulation, intelligibility, and prosody.

*For more information about services available at NMTSA, contact us at [info@nmtsa.org](mailto:info@nmtsa.org) or on the web at [www.nmtsa.org](http://www.nmtsa.org)*