Music and the Brain:
An analysis of how music therapy is used as a treatment for brain disorders
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Purpose
The purpose of this study was to:
• Define the primary areas of the brain and their uses in everyday tasks
• Discuss the interaction of motor and mirror neurons as they relate to the listening and performance of music
• Document commonly used music therapy treatments
• Self publish a book of songs for use by music therapists in a variety of treatments

Terminology
In order to understand how music affects the brain, we must first understand the basic lobes and functions of the brain. Below is a list of areas of the brain associated with the processing of music

Frontal Lobe- Voluntary movement, response to our environment, judgement, various memory functions

Parietal Lobe- Sensation from muscles and skin, location for visual attention, touch perception, goal directed voluntary movements, manipulation of objects.

Temporal Lobe- Hearing ability, memory acquisition, visual perceptions, categorization of objects.

Occipital Lobe- Visual Processing

Cerebellum- Coordination of voluntary movement, Balance and equilibrium, memory and reflex motor acts. (Queensland Health, 2016)

Areas of the Brain that Process Music

Neurons and Music
Motor neurons allow for a physical response, while mirror neurons allow for an emotional response. Music therapy uses music to reconnect a patient’s neurons with various emotions and physical responses in the brain.

Motor neurons- when we play an instrument, motor neurons in the brain allow our bodies to move in order to achieve the intended sound.

Mirror neurons- regardless of our musical background, when we hear or watch a performer, mirror neurons in the brain react just as if we were the ones actually performing. (David Byrne, 2012).

Music Therapy Treatments
Brain disorders have many different developmental challenges. Below are three categories of development challenges commonly associated with music therapy treatment.

Communicatory Development
➢ Autism Spectrum Disorders:
  • development of meaningful gestures, sounds, and language
  • diversion from repetitive behavior
  • increasing tolerance of sounds
➢ Neural Degenerative Diseases (Dementia, Alzheimer’s):
  • Music that has a deep connection can cause patients to sing with the song, or begin to communicate more freely while the song is playing

Social Development
➢ Autism Spectrum Disorders:
  • motivation to interact
  • tolerance of change and unpredictability
  • enhancing flexibility and responsiveness
  • providing meaningful shared experiences
➢ Neural Degenerative Diseases (Dementia, Alzheimer’s):
  • motivation to interact
  • Relation to other patients that are feeling similar emotions

Emotional Development
➢ Autism Spectrum Disorders improving sense of self and self esteem
  • developing expressive abilities
  • sharing of emotional experience (Nordoff Robbins Music Therapy,2011)
➢ Neural Degenerative Diseases (Dementia, Alzheimer’s)
  • Stimulative music can excite the patient with its high energy rhythms and heavy percussive sounds. This often times leads to a motor reaction (foot tapping)
  • Sedative music such as ballads and lullabies, or music that include unaccented beats, little syncopation, and a primarily slow tempo are the best when preparing for bed or any stressful change that can cause agitation. (AFA, 2016)

The Music Therapist’s Primer
A self published repertoire of songs that included a variety of genres and styles from various decades was created. The book serves as a resource for music therapist in the treatment of many commonly found conditions including autism and neural degenerative diseases.

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