Neurological Music Therapy and Parkinson’s Disease

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**Introduction**

- Neurological music therapy utilizes music to treat neurologically-based diseases or impairments.
- Movement Based Music therapy is a type of neurological music therapy which uses rhythmic auditory cueing to treat diseases resulting in motor control impairments specifically.
- Therapy consists of patients synchronizing motor movements which the find difficult to an externally cued musical beat.
- Treatment is non-intrusive and has no addictive properties unlike surgery or pharmaceuticals.
- Neurological music therapy can be used to treat irregular gait pattern.
- It is predicted that a cerebellar-thalamic circuitry during progression of Parkinson’s disease.
- Movement is motivated by response to an external cue instead of being generated internally.
- The pathway responsible for internally generated movements involves the basal ganglia and is impaired in those with Parkinson’s disease.
- Externally cued movements are carried out through a different neurological pathway than internally generated movements.
- It is predicted that a cerebellum-thalamic-cortical pathway of communication is what mediates entrainment of externally cued movements.
- fMRI and PET scans have shown high neural activity between the cerebellum and supplementary motor area during externally cued movement.
- Increased neural recruitment in cerebellum-thalamic-cortical pathways are found in participants with Parkinson’s disease post therapy.

**Neurological Mechanism**

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- It is predicted that a cerebellum-thalamic-cortical pathway of communication is what mediates entrainment of externally cued movements.
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- Increased neural recruitment in cerebellum-thalamic-cortical pathways are found in participants with Parkinson’s disease post therapy.

**Therapy Applications – Parkinson’s Disease**

- Parkinson’s Disease is a neurodegenerative disease affecting the basal ganglia causing imprecise movements, and tremor among other symptoms.
- Neurological music therapy can be used to treat irregular gait pattern by improving the regularity of stride length and step velocity.
- Therapy involves patients walking in time with an isochronous musical beat adjusted for normative gait pace.
- Over time music is reduced and patients learn to walk unassisted by quietly singing the song to themselves or replaying the song in their head.
- Treatment benefits have shown to carry on one month post treatment.

**Conclusion**

- Neurological movement therapy is an effective form of treatment to improve spatio-temporal aspects of gait and other motor task.
- Improvements in gait last beyond therapy and positively influence patient ambulatory independence and overall quality of life.

**Recommendations**

- Further studies using a longitudinal style to investigate how long movement-based music therapy is effective post treatment.
- Further applications of movement-based music therapy to movement task other than gait which influence daily living.

**References**