

TREATMENT OF SPEECH DISORDERS IN PARKINSON'S DISEASE

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Parkinson's disease (PD) is a basal ganglia disorder characterized by progressive death of dopamine-producing neurones in the substantia nigra pars compacta (SNc) and their projecting nerve fibres in the striatum. The cardinal signs of PD arising from the loss of the neurotransmitter dopamine include muscle rigidity (muscles resistant to movement), akinesia (inability to initiate movement), bradykinesia (slowness of movement), and rest tremor. Further, as many as 50–90% of individuals with idiopathic PD will develop speech and voice disorders, the most common perceptual features of these disorders including reduced loudness (hypophonia), reduced prosodic pitch inflection (hypoprosodia) or monotone speech), hoarse voice, and imprecise articulation (Olson-Ramig, Sapir, & Fox, 2004). The speech and voice abnormalities associated with PD have been termed hypokinetic dysarthria.

Since first described by James Parkinson in 1817, a number of different treatments have been applied in an attempt to stop or slow the progress of PD, including bleeding, purging of the bowels, a large variety of drugs, and neurosurgical procedures. In general these treatments have primarily targeted the cardinal signs of PD with any effects on speech only being regarded as a secondary outcome. Consequently, although treatments, such as levodopa therapy, have been effective, at least in the short-term, in reducing limb akinesia, rigidity, and tremor, parallel improvements in speech production do not appear to occur. Likewise, the results of the few studies documenting the effects of contemporary

neurosurgical interventions for PD on speech are also equivocal with some aspects of speech showing deterioration while others remain unchanged (Murdoch, 2010). Although contemporary behavioural speech therapy approaches such as the Lee Silverman Voice Treatment (LSVT) may be beneficial to speech in some individuals with Parkinson's disease in the short-term, these treatments are not appropriate for all cases and are associated with a high rate of relapse. Consequently, there is an urgent need for development of more effective and long lasting treatments for the speech impairment seen in association with Parkinson's disease. To that end, recent research has focused on a new approach to treatment of dysarthria in Parkinson's disease using transcranial magnetic stimulation (TMS). TMS is a non-invasive brain stimulation technique that is capable of modulating the activity of the brain. The method involves stimulation of the brain with a series of magnetic pulses delivered by a stimulating coil held over selected areas of the head. The early findings of this research suggest that high frequency TMS applied to the motor area of the brain is associated with improved speech intelligibility and articulatory function for as long as 12 months post-stimulation in chronic sufferers of Parkinson's disease (Murdoch, Ng, & Barwood, 2012). Future research based on a randomized placebo-controlled clinical trial will determine the long-term efficacy of TMS as a treatment for speech impairment in Parkinson's disease.

References

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