Formant Steadiness: Treatment Related Changes in Speakers with Hypokinetic Dysarthria

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This study was designed to investigate the effects of intensive voice treatment on formant steadiness in speakers with hypokinetic dysarthria associated with idiopathic Parkinson's disease and Parkinsonian syndromes. A non-invasive analysis technique, developed by Gerratt (1983), was used to measure the variability of formant frequencies around their means across sustained vowel phonation. Previous studies have used this technique to demonstrate reduced formant steadiness in speakers with spasmodic dysphonia, Huntington's disease and Parkinson's disease. No studies have examined the effect that targeting voice intensity during treatment (specifically LSVT®) has on supralaryngeal vocal tract steadiness. During acoustic analysis, 18 productions of 'ah' were examined from each of the 10 participants yielding coefficients of variation (the observational units for statistical analysis) for the formant frequencies of each vowel production. Statistical analysis of the coefficients of variation revealed a statistically significant main effect of treatment and trials ($p < .05$) associated with the first and second formants (F1 and F2). No significant effects involving days were noted. Results suggest that improving vocal effort/intensity also improves formant steadiness. Competing interpretations, i.e., typical motoric vs. acoustic signal processing (involving potential influence of formant bandwidth and amplitude on LPC tracking) will also be considered.