

Vowel space as a tool to evaluate articulation problems

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Treatment for oral tumors can lead to long term changes in the anatomy and physiology of the vocal tract and result in problems with articulation. There are currently no readily available automatic methods to evaluate changes in articulation. We developed a Praat script which plots and measures vowel space coverage. The script reproduces speaker specific vowel space use and speaking-style dependent vowel reduction in normal speech from the Dutch IFA corpus (5h speech, 5M&5F speakers). In recordings of 30 patients treated for oral tumors, deviant (distorted) articulation before and after treatment is evaluated in a listening experiment and from a maximal articulation speed task. Average Articulation Rate reduces after treatment. Vowel space use in these patients was visibly affected by treatment. Vowel space use before and after treatment is still significantly correlated. There is a shift observed from the /u/→/a/-corner in the vowel triangle. Deviant articulation correlates with Vowel-Space-Area and the shape of the /u/ and /i/ corners of the vowel triangle. In conclusion, measurements of vowel space use from running speech can be useful in evaluating articulation disorders.