

Correlation between vowel centralisation and incomplete stop articulation in individuals with traumatic brain injury

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Traumatic brain injury (TBI) often results in dysarthria, a motor speech disorder. Two processes often linked with TBI dysarthria are vowel centralisation and incomplete stop articulation. It is not clear to what extent these two processes are related to each other, and to what extent they might serve as indices of severity of dysarthria secondary to TBI.

The purpose of the study is to test the hypothesis that patients who centralise vowels will also have difficulties producing stop consonants with complete stricture. We postulate that TBI individuals who centralise vowels will also have difficulties achieving complete stricture in stops resulting in incomplete stop production because both processes are directly related to the weakness of the tongue. It is expected therefore that the correlation between these two processes found in the atypical production of both vowels and stops should be stronger in patients with more severe types of post-traumatic dysarthria because of their common organic origin.

Polish dysarthric speakers post TBI (n=6) and ten age-matched healthy controls with normal speech (n=10) performed the Polish Dysarthria Test for TBI Patients (PDTTP) (Połczyńska-Fischer and Pufal 2006). Three of the TBI subjects had moderate dysarthria (MOD) and three mild dysarthria (MIL). The test investigates phonemes in separation as well as in diverse phonetic contexts, including spontaneous speech. The data from the PDTTP were analysed acoustically and transcribed phonetically.

Vowel centralisation and incomplete stop articulation appear to be strongly correlated ($r=0,9$). The MOD group had an average value of 49.6 instances of incomplete stop production and 16.3 occurrences of vowel centralisation, whereas the MIL group produced incomplete stop articulation 5.3 times and had no instances of vowel centralisation.