

**5-year course of therapy-induced recovery in chronic
non-fluent aphasia
- Three single cases -**

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Abstract

Over a period of five years, three severely impaired chronic non-fluent aphasia patients with concomitant apraxia of speech (AOS) received annual treatment periods of specific rhythmic-melodic voice training SIPARI. This therapy concept focusses on improving planning, programming, and sequencing of speech movements emphasizing specifically the training of cognitive capabilities such as executive functions. Behavioral and neural data were assessed at the start of the therapy and continuously after each treatment period. As previously reported, a first major finding was that after the first treatment period, significant improvements in language and speech motor performance were measured going hand in hand with significant additional peri-lesional activation in all patients particularly in the posterior part of the left superior temporal gyrus. This activation pattern was continuously confirmed by each subsequent scan. However, assessments after the third treatment period yielded additional significant activations in dorsolateral prefrontal cortex regions, namely in the left middle and superior frontal gyri, and anterior cingulate gyrus resulting in a further statistically significant increase in speech profile level, an overall and clinically relevant measure of the severity of aphasia. On the basis of our results, we assume that even in long-term rehabilitation of severely impaired non-fluent aphasia patients the applied treatment may support coactivation with dorsolateral prefrontal regions, suggested to be particularly involved in cognitive processing. This left-lateralized dorsolateral prefrontal-parietal network is supposed to be engaged in domain-general aspects of active phonological memory.

To the best of our knowledge, no comparable studies are available as yet. Therefore, we hope that our study may serve to attract more attention for the late stages of long-term rehabilitation, not at least as a challenge for therapists and researchers alike.