Speech therapy interventions for acquired apraxia of speech: An updated systematic review

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Background: Apraxia of speech (AOS) is a motor speech disorder following brain damage, typically the dominant hemisphere, mostly due to a stroke. This results in impaired planning and programming of sensorimotor commands that need for speech to be phonetically and prosodically normal. This leads to a decrease in the quality of life of a person as well as their social and vocational participation. Of 8101 individuals with neurologic motor speech disorders, 6.9% reported AOS. Several systematic reviews have been published related to the treatment of apraxia. To best of my knowledge, no systematic review has been conducted to update the systematic review published in 2015 which included studies conducted until up to December 2012. At present, a limited amount of evidence is available on interventions for AOS. As a considerable body of literature for treatments of apraxia is available since 2012, present systematic review provides evidence for approaches that will help for an in-depth examination of particular interventions on AOS.

Objectives: The primary objective of this systematic review was to evaluate and summarize the available literature on speech and language therapy interventions for acquired apraxia of speech since 2013. As a secondary objective, the clinical phase, and the level of evidence of each study was evaluated.

Methods: This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) guidelines. It was registered with the International Prospective Register of Systematic Reviews (CRD42020209014). A systematic search in six electronic databases; PubMed, The Cochrane Library, Web of Science, Scopus, EBSCOhost and CINAHL was performed. The search period was from January 2013 to December 2020. Unpublished and ongoing trials were searched in ClinicalTrials.gov and the metaRegister of controlled trials. The primary outcomes of the study including a) improvement in treated behaviours, b) generalization and c) maintenance were evaluated and the studies were evaluated for the level of evidence and the clinical phase. The systematic review was assessed for its methodological quality.

Results: Of the 3845 records yielded after the search, 3070 records were left after removing duplicates. Seventy-four studies were selected as eligible studies for full-text review. Twenty records were selected for the quality assessment and included in the present review. Studies of randomized control trials, single case experiments, group experiment trials were included in this review. All the studies used articulatory kinematic approaches and no study was found to use any other treatment approach. According to the classes defined by the Clinical Practice Guidelines Process Manual developed by the American Academy of Neurology, one study

was identified in class II, five studies were identified in class III and fourteen studies were identified to fulfil all the criteria of class III except for independence of assessors' criterion. In terms of clinical phase, one study was in phase III, ten studies were in phase II and nine studies were in phase I.

Conclusion: Among the intervention of apraxia of speech, articulatory kinematic treatments have become prominent. Publication of a randomized controlled trial has strengthened the level of evidence of the apraxia of speech literature. Focusing on self-administrative therapies, use of technology for therapy administration, development of treatments that focus on apraxia of speech and aphasia simultaneously were identified as the new advancements of the apraxia of speech literature.

Key words: *Apraxia of Speech, Dyspraxia, Speech Therapy, Intervention*