

The effects of a volitional breathing technique on swallowing and respiratory coordination in individuals with ALS

Authors: Stuart Cleary, Amanda Bohachuk, Sanjay Kalra and Wendy Johnston

Background: The ability to maintain an open and clear airway is one of life's most basic biological functions. Virtually all individuals with amyotrophic lateral sclerosis (ALS) experience swallowing problems, weak coughing and an encumbered airway at some point in the disease process

Purpose: Many individuals with ALS have been found to display an aberrant pattern of breathing during swallowing characterized by post-swallow inspiration rather than expiration. This pattern may increase the risk for aspiration, choking and airway encumbrance. In this study, researchers examined effectiveness of a novel breathing technique in promoting a more normal pattern of respiration during swallowing in patients with ALS. The hypothesis was that the volitional technique would promote expiration, increase lung volumes and slow breathing rates while eating.

Methods: Participants were 25 individuals with definite or probable ALS (16 men, 9 women) with a mean age 65.4 years (21– 81 years). One-group pretest-posttest research design was used and the primary outcome variables were respiratory phase while swallowing, percent of tidal volume at onset of pharyngeal stage of swallowing and respiratory rate. Data was collected in the participant's homes using a Vernier 3-axis accelerometer, a respiration monitor belt and Logger Pro 3 data collection software.

Results: The intervention was shown to improve airway protection and clearance in the vast majority of participants. A large, robust and clinically significant treatment effect size was documented for each dependent measure. The frequency of a normal pattern of expiration while swallowing went from a baseline of 57% to 95% in the post treatment condition. Tidal volumes at onset of swallowing improved of 46% to over 70% and the mean respiratory rate while eating went 18 to 13 breaths per minutes as the result of the treatment. This decrease in respiratory rate provided participants 38% more time to swallow and to cope with any post-swallow residue in the throat between breaths.

Implications: These findings have important clinical implications for the symptom management of individuals with ALS. Palliative care is often considered synonymous with end-of-life care for patients in the terminal phase of their disease. However, palliative care does not preclude active interventions. In ALS, symptomatic treatment can involve active rehab techniques, such as the novel technique tested in this study, which aim to promote optimal functioning despite increasing impairments that accompany disease progression.

This research project which was supported by a Covenant Health Research Grant (Project #CHG-1086).