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Opinion

Reframe and Discover if Motor Observation & Imagery of Swallowing Movements Improves Patient Outcomes?

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Could the use of motor observation and motor imagery of swallowing movements be effective in improving patient outcomes in dysphagia rehabilitation?

A review of neurophysiological and neurobehavioral literature supports the use of motor imagery and observation of motor movements as an effective cognitive therapeutic strategy to increase and enhance physical rehabilitation. A literature review by Robbins et al revealed, "All aspects of oropharyngeal swallowing have been found to be modifiable with varying sensory input." A principal goal in dysphagia rehabilitation is to create improvements in strength, duration, and timeliness of swallowing through active exercises and maneuvers which foster neuroplasticity to maintain neuro musculature systems involved in swallowing. Neuroplasticity is the brain's ability to change functionally and structurally through stimulation. Motor imagery is an active process during which the representation of an action is internally reproduced and imagined within working memory (Jackson, Lafluer, Malouin et al, 2001). Motor observation or action observation refers to the tangible viewing of motor movements. A review of the literature supports that the observation of a movement can influence the execution of the movement (Th. Mulder, 2007). This study investigated if the use of motor observation and motor imagery of swallowing movements is effective in improving patient outcomes in dysphagia rehabilitation.

15 patients in a skilled nursing facility referred for bedside dysphagia evaluation were selected to participate in this study. A clinical bedside swallow evaluation was conducted on each patient and patients were placed on dysphagia treatment. All patients underwent a fiberoptic endoscopic evaluation of swallowing (FEES) to further assess pharyngeal swallow physiology. During the FEES, two teaspoon trials of puree were administered. One trial was administered prior to the presentation of a video demonstrating swallow function from the lateral view, and one trial was administered following the presentation of the video. The visual representation of the swallow demonstrated a bolus moving from the oral cavity through the pharynx and into the esophagus. Patient was instructed to watch the video as the bolus moved through the pharynx for 5 consecutive swallows.

The following variables were obtained for each trial administered during the FEES: (a) severity of residual following the initial swallow according to the Yale Pharyngeal Residue Severity Rating Scale, (b) depth of residual in the pharynx, (c) number of swallows needed to clear post-swallow pharyngeal residue.

Post-swallow pharyngeal residue is a clinical predictor of aspiration and aspiration related complications. The *Yale Pharyngeal Residue Severity Rating Scale* is a standardized, reliable tool that is anatomically defined and imaged-based (Neubauer, Rademaker, Leder, 2015). It is used to classify residue location (vallecular and pyriform sinus) and residue severity (none, trace, mild, moderate, or severe) for diagnostic and therapeutic purposes. The anatomical depth to which post-swallow pharyngeal residue was included as it is associated with increased risk for aspiration post-swallow. For example, patients with post-swallow residue at the level of the pyriform sinus appear to be at greater risk for aspiration after the swallow than patients with post-swallow residue at the level of the vallecular. Commonly used therapeutic strategies used for pharyngeal residue is the use of effortful swallow maneuver and secondary swallows, therefore the amount of swallows needed to clear post-swallow pharyngeal residue was recorded.

Following the FEES, these variables were analyzed and compared to determine if visual observation and imagery of swallowing improved patient's swallow function.

The results of the current study were inconclusive thus far as the correlations between pre and post video variables were insignificant. Following analysis of three measures of swallowing efficiency pre and post presentation of video stimulation, it was found that only six patients improved in regards to number of swallows required to clear bolus from pharynx, four improved in regards to amount of residual noted in pharynx (measured by *Yale Pharyngeal Residue Severity Rating Scale*), and two improved in re: to depth of residual noted in pharynx. As such, nine participants were noted with no improvement number of swallows required to clear residual. It should be noted, that one participant showed decline in measures; one participant required an increased number of swallows to clear residual post presentation of video imagery and was noted with an increased amount of residual noted. The limitations of the current study include: small sample size, cognitive status of patients,

environmental variables (i.e. background noise during FEES), age of patients, and unreported visual/audio deficits. However, the use of motor imagery and action observation of swallowing to improve motor performance may have potential application for dysphagia management. Further studies should aim to further investigate impact of motor imagery and action observation on swallowing function by controlling for limitations outlined above.

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