Evaluating the Efficacy of Treating Misarticulated /s/ with Tactile Biofeedback

Gordy Rogers, MS CCC-SLP
Associate Research Scientist
Articulate Technologies, Inc.

Jessica Galgano, PhD CCC-SLP
Associate Research Scientist
NYU School of Medicine, Department of Rehabilitation Medicine

A B S T R A C T

This randomized, controlled, single-blind study examined the efficacy of the Speech Buddy™ /s/ tool which uses the method of tactile biofeedback to teach correct tongue placement. Twenty school-aged subjects were randomly assigned to an experimental group or a control group and treated with eight individual therapy sessions. The experimental group, which used tactile biofeedback, recorded a statistically significant remediation response (p < .05), whereas the control group, which used only traditional phonetic-based treatment, did not show a statistically significant treatment benefit. These results suggest that tactile biofeedback enabled more efficient and consistent gains across the treatment period.

Subjects

Twenty (20) subjects were enrolled in the research study, and were randomly assigned to the control or experimental group. Enrollment was based on the following criteria:

- Ages 5:0 to 8:11 years at the time of assent and parental permission.
- Incorrect production of the /s/ phoneme (i.e. 0-20% correct) according to a proprietary picture naming test that contained fifty (50) items.
- Hearing function within normal limits
- Age-appropriate receptive and expressive language skills (CELF-4 Screening Test)
- Native speakers of American English
- Have received less than ten (10) hours of therapy time for a speech sound disorder, as per parent reports.

Methods

This was a randomized controlled, single blind study to test the efficacy of an intra-oral tactile biofeedback device for the /s/ sound, the Speech Buddy™ (Articulate Technologies, Inc.). The test article taught correct tongue and jaw placement for the /s/ sound. The figures above highlight key features of the test article and how it can be used as a therapy aid in combination with simple verbal cues.

Treatment Session Structure:

- Eight sessions of approximately twenty-five (25) minutes over a four to seven week period
- Forty-five (45) stimulus items (5 auditory discrimination, 6 isolation/syllables, 34 in words)
- Items chosen to represent a wide range of vocalic and consonantal contexts
- The number of items trained was consistent for both test groups

Control Group:

Traditional phonetic-based treatment sessions began with phonetic placement techniques that described correct placement and was followed by a clinician producing the model of the target sound in isolation. In addition, verbal cues, visual cues and auditory bombardment were used during the sessions. Table 1 summarizes a sample treatment session.

Results

By the end of treatment, the mean change in accuracy of producing /s/ in the experimental group exceeded that of the control group. The figure above shows the average mean percentage accuracy over time for both the experimental and control groups. The experimental group, which used tactile biofeedback, recorded a statistically significant remediation response (p < .05), whereas the control group, which used only traditional phonetic-based treatment, did not show a statistically significant treatment benefit.

Discussion

This is a preliminary study designed to examine the efficacy of an intra-oral tactile biofeedback device in treating /s/. The results suggest that the device enabled more efficient, consistent and continued gains across the treatment period.

The data also suggest that intra-oral tactile biofeedback delivers a more reliable remediation response than does the traditional approach to treating speech sound disorders, which supports the notion that SLPs should deploy multimodal cuing from the start of therapy. The results obtained in the study also correlate to efficacy data found in investigations into other biofeedback technologies in speech sound treatment.

References