

Perceptual and ultrasonographic measures of change during articulation therapy for sibilant distortions

- Background & Purpose: Speech sound disorders of /s/ are common and can be difficult to address in speech therapy. Outcomes are usually assessed based on perceptual judgments but it is unclear how the motor patterns and time-course of the speech movements may change as a result of therapy. The aim of the present study was to explore quantitative measures from ultrasound recordings, which could be used to compare outcomes between treatment groups.
- Method/Description: Seven boys (ages 4-8 years) took part in the study. All the children were referred for /s/ distortions. Three children received 10 sessions of traditional articulation therapy, and 4 children also received 10 minutes of ultrasound feedback per session. Tongue movement was recorded with ultrasound before, after 5 sessions, after 10 sessions, and 1 month after the end of therapy. Six sentences from an articulation screening were used for perceptual analyses. Five listeners rated the acceptability of the target sound in the sentences. Five repetitions of the syllables /asa/, /ese/ and /oso/ were used to assess tongue movement and duration. Data were analyzed using repeated measures ANOVAs.
- Results: For the perceptual ratings, there was a significant improvement ($F(3)= 9.300, p > .001$) in speech acceptability over the 4 assessment sessions. Additionally, there was a significant interaction between the two treatment groups ($F(3)= 3.941, p = .009$), indicating that the non-ultrasound group had better acceptability ratings. The duration measures indicated that the syllables were produced more quickly after treatment ($F(2.461)= 6.160, p = .002$). A significant interaction demonstrated that the participants not receiving the ultrasound biofeedback produced the syllables more quickly ($F(2.461)= 5.375, p= .004$). In terms of the tongue displacement, the ultrasound data did not show any significant changes over the course of the treatment.
- Conclusion: The speech therapy led to an improvement in the perceived acceptability as well as in the duration of the target sound. Whereas the group without biofeedback showed a greater improvement in the perceptual ratings, the group with ultrasound improved more in terms of duration. However, the study group was small and heterogeneous. The study provides us with new quantitative measures to evaluate speech movement and duration changes during articulation therapy. In future research, this may enable us to find more conclusive answers about the effectiveness of articulation therapy and the possible benefit of ultrasound biofeedback.
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