Analysis Of English Dental Fricatives In Individuals With Cosmetic Tongue Bifurcations

Alyson Budd, Murray Schellenberg & Bryan Gick

Department of Linguistics, University of British Columbia

Bifurcated tongues do not seem to differ in magnitude of speech movements required for dental fricatives

Quick Summary

Do bifurcated tongues exhibit different magnitudes of movement than nonbifurcated tongues during production of dental fricatives? 8 participants (4 bifurcated, 4 control) at UBC’s ISRL.

Acoustic and Ultrasound data were collected for analysis. Although trained listeners noted some atypical-sounding fricatives, preliminary findings suggest there is no significant difference between the magnitude of movement for dental fricative gestures of bifurcated vs. nonbifurcated tongues.

Introduction

Examples of elective body modifications range on the spectrum from piercings and tattoos to cosmetic surgeries such as breast augmentation. Members of the bodymod subculture report different gestures of the bifurcated tongue tip (Participant 103).

Bifurcated tongues are both cosmetically and functionally different from nonbifurcated tongues. All bifurcated participants demonstrated independent control of both tongue halves.

The existing research on tongue bifurcation is limited to case studies and does not go into longitudinal studies on the effects of tongue bifurcation. The potential medical applications of bifurcation (e.g. for the hemiparetic tongue to regain motility), phonetic detail (e.g., Bressmann, 2004; Aga & Harris, 2013; Benecke, 1999). Given the potential medical applications of bifurcation (e.g. for the hemiparetic tongue to regain motility), phonetic detail (e.g., Bressmann, 2004; Aga & Harris, 2013; Benecke, 1999). Given the

The Participants

All participants spoke with Canadian English dialects (AB, BC, ON)

<table>
<thead>
<tr>
<th>Type of Participant</th>
<th>Control</th>
<th>Bifurcated</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 participants (2 women, 2 men)</td>
<td>101 m, mid-20s (BC)</td>
<td>101 m, mid-20s (BC)</td>
</tr>
<tr>
<td>2 participants (1 genderqueer person, 2 women)</td>
<td>102 w, late-20s (AB)</td>
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</tr>
<tr>
<td>2 participants</td>
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</tbody>
</table>

No participants reported congenital malformations of the speech anatomy, nor hearing loss, nor fluency in additional languages.

Length of bifurcation varied from ~1.5 – 2.5 cm. The group of interest undertook bifurcation via the scalp-and-suture (201-203), or the ablation method (204) and reported rapid adaptation over 2 – 4 weeks.

The Stimuli

16 artificial displayable letters and symbols were used to elicit intonational segments of interest. They were presented in English orthography. All participants heard the stimuli aloud at their own pace.

Fricative tokens: [æθə], [æθə], [æθə], [θə], [θə], [θə], [θə], [θə]

Word tokens: “author” [author], “other” [other]

Distractor tokens: [æθə], [æθə], [øθə], [æθə], [æθə], [æθə], [æθə], [θə]

Segments under present analysis: [θə]

Target tokens: distractor tokens presented randomly

1 block = 40 randomized iterations of 16 different tokens

1 training block, 5 experimental blocks

Data Collection

Participants sat in an ophthalmic examination chair with their heads stabilized against a headrest (a la Gick et al., 2005). The ALOKA ultrasound probe tip was placed between the hyoid bone and the mental protuberance. The recording microphone was placed ~18 cm from the mouth (sampling rate = 44 100 Hz)

Analysis

Optical Flow Analysis – FlowAnalyzer

Mid-sagittal oriented ultrasound videos of the participants’ speech were analyzed to determine if magnitude of movement in fricative production is greater for bifurcants.

Statistics Analysis – R Statistics Package

A Welch 2 sample t-test was conducted to compare the magnitudes of tongue tip movement during fricative production, and no statistically significant difference was found.

Discussion

When conversing with bifurcated individuals, it is clear that their speech intelligibility is not affected. The acoustic differences in the speech stream are slight, but noticeable, and do not manifest themselves in significantly different magnitudes of movement under our analysis.

Bifurcated participants all reported that they adapted well to the bifurcation, experienced no negative consequences to their oral health, and enjoy the functional effects the cosmetic procedure has afforded them.

More generally, as this is a descriptive study that sought to collect data on an under-researched population, this study posits recommendations neither for nor against bifurcation.

What’s Next?

Before-and-after measures, including acoustic analysis to determine the extent to which bifurcation impacts articulations and sounds in the individual speaker.

Coronal orientation ultrasound Optical Flow Analysis, to determine if the changes in movement are better seen from the coronal perspective, to determine whether mediolateral compression of the tongue, which may serve as an adaptive strategy to bring the halves together, can be observed.

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Participants 202 demonstrates independent movement of his tongue halves

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