Examining tongue tip gestures with ultrasound: a literature review

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The tongue tip and blade are notoriously difficult regions to image with current ultrasound techniques. This is due to both the shadow cast by the jaw as well as the occurrence of pockets of air beneath the tip of the tongue that cause the ultrasound to reflect back before reaching the surface of the tongue (Stone 2005). The two reasons for difficulty imaging the tongue tip each carry with them unique challenges for researchers using ultrasound; this review, however, will focus only on the former. While electromagnetic midsagittal articulography (EMA) has been utilized as one alternative or supplement to ultrasound in studies where tongue tip movement is of central interest (Kochetov et al 2014, Marin & Pouplier 2013), it is not always the ideal methodology as it demonstrates the trajectory of only specific points on the tongue over time.

In the event that the tongue tip extends beyond the range of the ultrasound or is obscured by the jaw shadow, measurements may be made up to the most anterior point of the tongue that is visible (see ultrasound images in Lin et al 2014, and Miller & Finch 2011) or indicated by an additional marker on the ultrasound images, as was the case in Campbell et al. (2010). While both methods provide references relative to the image that may not correspond to the same points on the tongue, these different methods provide distinctive data, and results gathered may therefore appear divergent. Mielke and colleagues, on the other hand, used video to complete the tongue contour in their study of a Kagayanen interdental approximate (2011), which provides more accurate information.

The present literature review examines recent studies involving tongue tip gestures and evaluates the methods used for data analysis in order to bring about a discussion as to which is most effective at providing an accurate picture of the tongue across conditions, what differences, if any, may result in significant alterations of the data collected. As a final step, I recommend a simple experiment to compare these methods in order to further demonstrate the effects of this choice upon data collected.

References

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