

Title: Glottal opening pattern during Japanese geminate consonants (sokuon)  
 Category: (1) phonetics/phonology

The glottal opening pattern of sokuon, or Japanese geminate consonants, is examined using a newly developed technique of “external lighting and sensing photoglottography,” or ePGG. In many languages including English and Berber the degree of glottal opening is greater in geminates than singletons. However, ePGG shows that the degree of opening for Japanese geminates is relatively small, even negligible for stop geminates (eg. /tekke/) except for fricative ones. The temporal opening pattern during geminates shows a skewed shape (eg. /tekke/), again except for the fricative one, while that during singleton and the /CVC/ sequence with a devoiced vowel shows a Gaussian-distribution shape (eg. /kite/). Appreciable opening for stop geminates is skewed to the end of the consonant: i.e, glottal opening is kept small during the closure period and becomes larger, if at all, around the point of oral release (eg. /tekke/). These results are in agreement with the findings from high-speed video analysis (Fujimoto 2011). In cases of /CVC/ sequences with a devoiced vowel, peak glottal opening appeared during devoiced vowels and /CC/ was accompanied by small openings (eg. /kitte/). These results suggest that the temporal arrangement of the glottis are maximized to fit the aerodynamic requirements, aspiration and frication, for the consonant(s) or voiceless sequences. VOT of sokuon has been said to be shorter than that for singletons (Han 1994). The present data gives articulatory evidence for the claim.

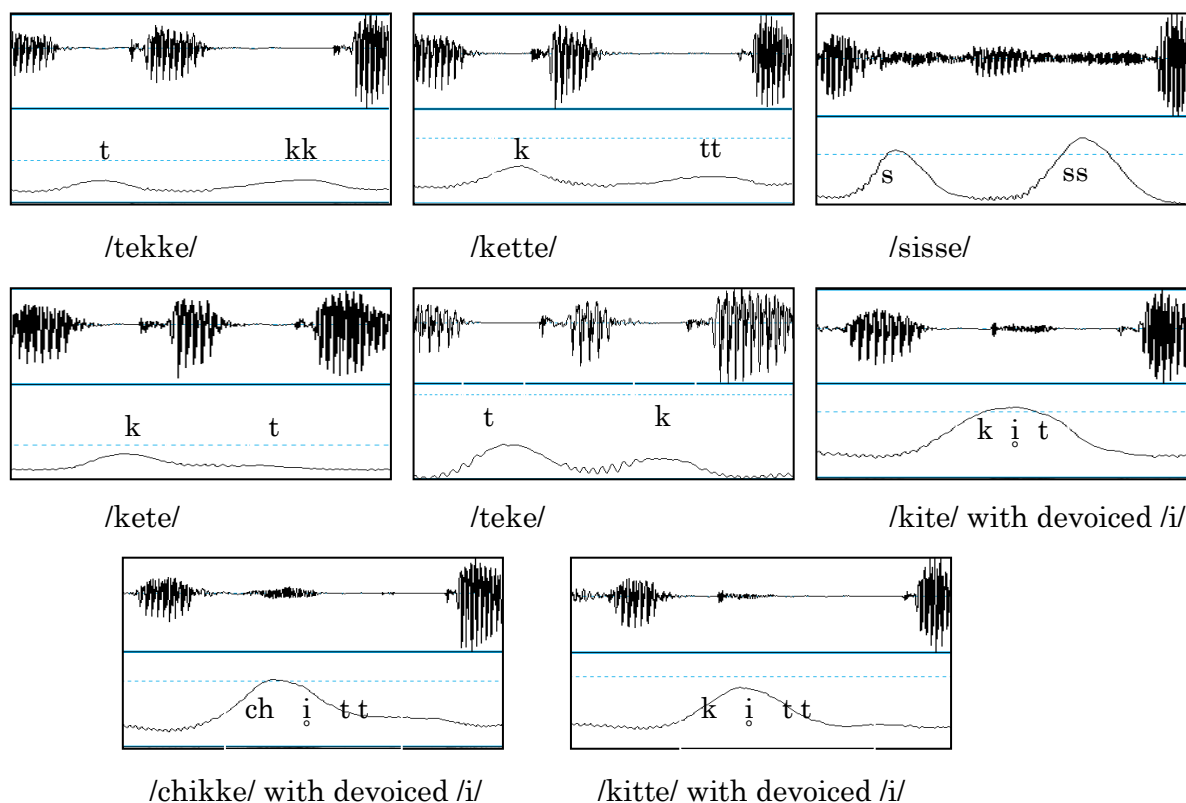


Figure.1 Glottal opening pattern during test words followed by /e/ in a carrier sentence.

#### References

- Fujimoto M. (2011) Physiological characteristics of sokuon: A preliminary study, ICPP .  
 Han M.S. (1994) Acoustic manifestations of mora timing in Japanese, JASA, 96, 73-82