

ACOUSTICS2008/1353

Physical modelling of Vowel-Stop-Vowel sequences

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The physical phenomena involved in the production of vowel sounds are now well described and several effective physical models have been developed. On the contrary, only a few studies concern the physical aspects of the production of consonant sounds (fricatives, stops...) or the production of vowel-consonant-vowel sequences. Indeed, more complex acoustical and aerodynamical mechanisms should be considered (generation of aeroacoustical sources, dynamical description...). In this contribution, we focus on the production of vowel-stop-vowel sequences. A stop sound is produced after a complete occlusion of the vocal tract. In an intervocalic context, the closure entails an increase of the intraoral pressure, which results in the cessation of the vocal folds vibration. The opening is quickly followed by the generation of an aeroacoustical source, and entails a decrease of the intraoral pressure, which results in the resumption of the vocal folds motion. A physical model able to describe these aerodynamical observations and to predict the evolution of the intraoral pressure during the closure gesture is first detailed. Different interesting results are discussed (influence of the closure time, influence of the closure position, coordination of the different sources...). And a confrontation between theoretical results and experimental data is presented.