

X-ray and model studies of vowel articulation

Abstract

The thesis consists of five articles that report various aspects of vowel articulation. Individual manoeuvres are analysed with the help of cinefluorography and their contributions to spectral contrasts are estimated in model experiments by reproducing them on midsagittal profiles and calculating and evaluating the vocal tract resonances for each configuration. A model is outlined in which physiologically relevant manoeuvres are coordinated to shape the vocal cavities for the intended spectral contrast. The physiology of vowel production is discussed. Manoeuvres are related back to speech motor programming and motor control, and forward to the encoding of the speech signal. Papers I and II deal with constriction locations. Paper III explores the acoustical consequences of lip, tongue, and larynx manoeuvres in rounded palatal vowels. Paper IV is concerned with mandibular, lingual and labial articulation in palatal vowels. Paper V is devoted to tenseness and laxness. With the model as a starting point various general problems of speech production are discussed: the quantal nature of speech, articulatory precision and tolerances, motor control and compensations, the resonance properties of the vocal tract, phonological implications.

Wood, S. *X-ray and model studies of vowel articulation. Working Papers 23*, Department of Linguistics, Lund. 1982. PhD thesis.