

The oral cavity, which is the gate to the digestive system, is both a fully biological area, responsible for food intake and correct closing of the system, as well as the structure taking part in the realisations of higher functions such as speech. This functional dependence was the starting point and inspiration for designing research based on examining mutual relations between mechanisms used in biological functions and in higher functions.

The aim of the proposed project is gaining new knowledge and describing mechanisms functioning in the oral cavity responsible for shaping chosen primary functions (tongue rest position, that is the manner of holding it in the mouth cavity when we are not speaking and also during oral phase swallowing) as well as recognising their relation to articulation. During the study, we will want to check whether the correct or disturbed implementation of the resting position of the tongue, will correlate with a correct course or impairments of the oral phase swallowing and articulation.

Thirty two adult speakers of the Polish language will be examined. The project recording sessions will take place in two different locations: in the Applied Phonetics Laboratory of the Institute of Applied Polish Studies at the University of Warsaw and in the myofunctional speech therapy clinic.

8 speakers will take part in studio recordings: (i) two representing the articulatory, anatomical and functional norm, (ii) six with impairments of the tongue rest position, oral phase of swallowing and articulation. The examinations will be carried out with simultaneous usage of: (i) the electromagnetic ariculograph by Carstens model AG501 – the sensors of this device are fastened onto the articulatory organs of the examined subjects (e.g. on the tongue) and will allow for a dynamic imaging of their position, due to using a variable electromagnetic field during testing; (ii) two fast, industrial video cameras – front and side (to register the arrangement of the external organs i.e. lips); (iii) Acoustic Field Distribution Analyser (the so called acoustic camera), especially designed for the purpose of the experiment, to test the distribution of the acoustic pressure during speech, which will allow us to identify, for example, unwanted lateral or nasal articulations and related asymmetries.

Furthermore, 24 persons with impairments in primary functions and articulation, undergoing speech therapy, will be examined under clinical conditions using only the Acoustic Field Distribution Analyser (altogether 32 persons will be examined using this method). It is worth noting, that the Polish language is the first language in the world, for which our team has already developed a description of normative pronunciation using the acoustic camera. It will also be the first language for which such a description will be developed for impaired pronunciation. The development and validation of a non-invasive method for the analysis of articulation/vocal tract parameters using a portable Acoustic Field Distribution Analyser could be used on a large scale in clinical settings in the future.

It should be stressed, that until now in global research, in which objective instrumental techniques have been used, such as ultrasound, electromagnetic articulography or magnetic resonance imaging, the focus was mainly on examining single abilities (e.g. tongue's position at rest or swallowing or articulation), rather than correlations between them, which is the aim of the hereby project. This will not only have an extremely important input into the position of global research but will also initiate the development of objective instrumental research in Polish speech therapy. The recognition and description of the presented relations between primary functions and articulation as well as acquiring detailed knowledge, confirmed by objective (instrumental) research, provides us with great potential in planning cognisant therapeutic processes in speech therapy and will contribute to the standardization of myofunctional practice connected with orthodontic treatment.