

# Speech disorders

**Speech** is an organizationally rather complex tool of human communication. For correct speech, whether spoken or written, it is necessary to have in order:

- **afferentation** (auditory analyzer or visual analyzer for the written word for perception and subsequent processing of perceived speech or writing in the nervous system);
- **efferentation** (neurons innervating muscles involved in speech or writing);
- **muscular apparatus** involved in speech or writing;
- **cerebellum, extrapyramidal structures and other subcortical regulatory systems;**
- **association cortical areas.**

## Division of Speech Disorders

- **Aphasia** - impairment in the production or understanding of speech. We distinguish between several types of this **acquired defect** according to the fluency of speech (fluent (Wernicke's), nonfluent (Broca's), or global). The extent of the impairment depends on the affected areas in the brain.
- **Dysphasia** - is a **congenital disorder** of speech of varying extent. Dysphasias include, for example, dyslalia.
- **Dysarthria** - a disorder of articulation, with a disorder of the innervation of the vocal cords or defects of the structures involved in pronunciation (tongue, lips, teeth, etc.).
- **Aphonia, dysphonia** - hoarse or whispered speech in disturbed innervation of the larynx or vocal cords.
- **Rhinolalia, nasolalia** - "nasal speech" in palsy of the soft palate.
- **Dyslalia** - slurred speech in children with delayed speech development.
- **Balbuties** - stuttering, usually of neurotic origin (functional).
- **Mutism** - muteness, mostly psychogenic.
- **Atactic (Chanted) speech in disorders of the cerebellum.**
- **Monotonous speech in Parkinson's syndrome as part of hypokinesia.**

## Aphasia

### Broca's (Nonfluent, expressive, motor)

This is a disorder of expression. The patient speaks little, articulates poorly, speech is not fluent, poor expression, sometimes a sentence consists of only one word. Word order is often wrong. The patient understands well and complies with instructions. He is fully aware of his handicap. The cause is a lesion of the corticosubcortical landscape of the frontal or insular dominant hemisphere. At the same time there is hemiparesis.

### Wernicke's (Fluent, Perceptive, Sensory)

Comprehension disorder. The patient talks a lot, articulates well, speech is fluent. The patient creates new words that do not make sense, the expression is thus confused and forms a so-called "word salad". The sick person does not understand, he does not respond to instructions. He is not aware of the handicap. The cause is a lesion of the perisylvian landscape of the temporal dominant hemisphere. At the same time, there is a sensitive parietal disorder, hemianopsia, alexia, agraphia.

### Global

Combination of Broca's and Wernicke's aphasia in more extensive lesions of the frontal, parietal and superior temporal regions. At the same time, hemiplegia, hemihypesthesia, hemianopsia are common.

### Conductive

The patient speaks fluently and understands fairly well. However, he creates new words by shuffling letters or shuffles words around in a sentence (paraphasia). The patient has a problem with repeating speech. It may be a consequence of modification of Wernicke's aphasia.

### Amnestic

The patient forgets commonly used concepts. But he chooses the right one from the several options offered. He understands well. It occurs when the deeper structures of the dominant temporal lobe are damaged. (According to some authors, however, all types of aphasia manifest themselves after a certain time under the image of amnestic

aphasia and therefore this type has no localizing clinical value<sup>[1]</sup>)

## Evidence of Dominant Hemisphere <sup>[1]</sup>

Speech functions are primarily stored in the dominant hemisphere. In 80% of the population it is the left hemisphere, in 17% the right hemisphere, and in 3% of the population we are unable to determine it. However, it is not an unequivocal rule that all right-handed people have a dominant left hemisphere and vice versa. Therefore, there are objective examinations that prove the dominant hemisphere.

### Wada Test

The principle consists in the intra-arterial application of *amytal sodium* to the basin of the *a. cerebri media* of one hemisphere. It is then disabled for a few minutes.

### Dichotic Hearing Test

The auditory pathway ends in both – the homolateral and the contralateral hemisphere. However, the crossed path is more significant and therefore, when the other ear is deafened, both hemispheres (temporal lobes) can be tested separately.

## Links

### Related Articles

- Aphasia/PGS/diagnosis
- Disorders of speech and other symbolic functions

### References

1. NEVŠÍMALOVÁ, Soňa – RŮŽIČKA, Evžen – TICHÝ, Jiří. *Neurologie*. 1. edition. Galen, 0000. 0 pp. ISBN 80-7262-160-2.