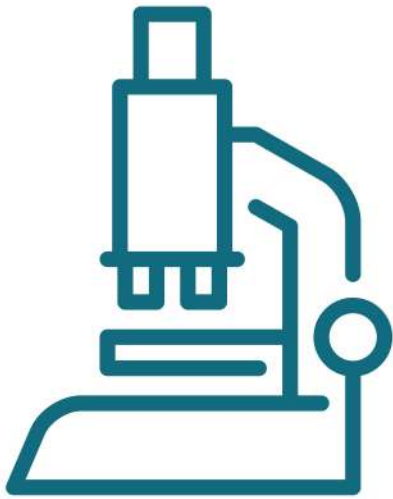


# KHARKIV NATIONAL MEDICAL UNIVERSITY

# ISIC-2020



**KHARKIV NATIONAL  
MEDICAL UNIVERSITY**



**BIOMEDICAL SCIENCES**





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## **DETERMINATION OF NASAL RESISTANCE ACCORDING TO CT DATA**

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The most significant factor determining the normal functional state of the nasal mucosa is what passes through it during inhalation and exhalation of the air stream, which, entering the nasal cavity, due to the active expansion of the chest, feels resistance from the surrounding structures. This factor is influenced by such an indicator as the resistance of the airflow, with 54% of the total resistance of the respiratory system to the upper respiratory tract, including 46% of the resistance of the nasal cavity.

The nose has a very complex architectonics. Therefore, the urgent task is to study the influence of the anatomical structures of the nasal cavity on the change in airflow.

However, this task is challenging by the fact that the nasal canal is short. Therefore, it is ambitious to take into account the mutual influence of local resistances. Its size is about 7 cm long and divides the nose in two by a nasal septum. The nasal canal contains three turbinates on the lateral walls of which disturbances are introduced into the airflow.

We defined the method, that is consists of the following steps:

- obtaining and analyzing rhinomanometry parameters (air flow rate and pressure drop) to determine the breathing pattern;
- computed tomographic examination of the patient for anatomical mapping of the nasal cavity;
- construction of a spatial model of the nasal cavity based on segmented computed tomographic data .;
- construction of an aerodynamic model of the nasal cavity based on the combined data of rhinomanometry and computed tomography at various airflow regimes;
- determination of pressure losses along the length of the nasal cavity;
- determination of pressure losses in local nasal cavities;



- determination of the integral coefficient of aerodynamic drag of the nose.

The advantage of our proposed method for determining the resistance of the nose is that the aerodynamic model is built using computed tomography data.

And the study is carried out by establishing physiological norms of respiration in different modes of respiration.

That is, it is possible to study the aerodynamic drag from the configuration of the nasal canal along the horizontal sections.

The principal nasal airflow regime is turbulent, in which the logarithmic velocity profile at typical flow rates is set at about half the length of the nasal cavity. The analysis of the configuration of the nasal cavity showed that the most common local disturbance of the airflow in the nasal passages is the resistance of the "latch" and "turn of the flow" type, caused, as a rule, by the presence of local curvature of the nasal septum.

*Rasuli Nelab*

## **RISK OF THYROID DISEASES IN YOUNG PEOPLE**

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Introduction. Thyroid disease is the second most common endocrine disease after diabetes. According to the American Thyroid Association, almost half of people with thyroid pathology were not diagnosed with thyroid disease. However, dysfunction of the thyroid gland affects adversely the organism's metabolism and can lead to the development of many different diseases if this problem is not detected in time and treatment is not started. The etiology of thyroid disease is quite complex and not always clear. The most likely causes are iodine deficiency, genetic predisposition, pollution, stress and social conditions. The aim of our study was to identify the risk of occurrence and development of thyroid disease in young people.