Introduction: Obstructive sleep apnea/hypopnea syndrome (OSAHS) is a chronic disease characterised by repeated episodes of upper airway obstruction during sleep. The prevalence of moderate and severe OSAHS in the adult population is even up to 23.4% for females and 49.7% for males. OSAHS makes patients susceptible to a number of chronic cardiovascular, neurological and metabolic diseases. Craniofacial anatomy plays an important role in the etiopathogenesis of this condition. The study was aimed at identifying the correlation between the cephalometric parameters specifying the morphology of the craniofacial skeleton and soft tissues and the hyoid bone and the incidence and severity of obstructive sleep apnea. Another aim of the study was to analyse the correlation between obesity and OSAHS.

Material and methods: The study was retrospective in nature. The study involved 96 patients who underwent a polysomnographic examination and cephalometric analysis. The subjects were divided into a control group comprising 22 persons and a study group comprising 74 persons. The study group was divided into three sub-groups: patients with mild OSAHS, patients with moderate OSAHS and patients with severe OSAHS. In addition, the patients were divided into two groups, taking into account the BMI value: patients without obesity and patients with obesity (BMI≥30).

Results: An analysis comparing the cephalometric parameter values, which specify the craniofacial and nasopharyngeal morphology, to the values of AHI (apnea/hypopnea index – the number of apnea and hypoventilation episodes per hour of sleep) and ODI (oxygen desaturation index – the number of times that desaturation events occur per hour of sleep), as well as the percentage time spent with a saturation level below 90% showed no statistically significant correlations. An analysis comparing the cephalometric parameter values, which specify the oral and middle pharyngeal morphology, to the AHI and ODI values and the percentage time spent with a saturation levels below 90% showed statistically significant positive correlations between the AHI value and the following parameters: Tt-Tb ($P<0.001$), Go-Tb ($P=0.002$), Tt-Et ($P=0.001$), PNS-Tb ($P=0.006$) and PNS-Ut ($P<0.001$). In addition, a statistically significant negative correlation was revealed for the measurement of Ut-PhW1 ($P<0.001$) with the same index. An analysis comparing the cephalometric parameter values, which specify the position of the hyoid bone and the lower pharyngeal structure, showed a positive correlation between the AHI value and the values of measurements of Go-H ($P=0.005$) and Go-Gn-H ($P=0.008$). Significant differences were observed in the BMI between the OSAHS severity groups ($P<0.001$). As compared to the group

without OSAHS, patients with mild, moderate and severe OSAHS exhibited a significantly (P=0.02) higher BMI value.

Conclusions: Specific anatomical determinants of the craniofacial skeleton and the hyoid bone, as well as the soft tissues of the upper respiratory tract, have an effect on the incidence and severity of obstructive sleep apnea. It is, therefore, advisable to consider the use of cephalometric analysis as a screening test to distinguish a group of patients at increased risk of OSAHS. This will allow the necessary examinations to be carried out more quickly and a treatment to be implemented before the development of adverse consequences of the disease, such as hypertension, ischemic heart disease or ischemic stroke.

Keywords: obstructive sleep apnea syndrome, cephalometry, polysomnography, AHI, obesity