

SUMMARY

The stomatognathic system is a morphological and functional complex undergoing dynamic transformations during an individual's life. It consists of the teeth, bones of the maxilla and mandible, temporomandibular joints, and the neuromuscular system. All elements of this system are in a close functional relationship. However, with developing knowledge about the physiology of the masticatory system, there are more and more controversies and even extremely differing opinions regarding the state of the teeth's impact on muscle activity. There is also no clearly defined physiological norm for the young adult population in Poland.

Factors determining the range of motion of the mandible include the teeth and muscles. During mandibular protrusion or its lateral movements, the incisal edges of the mandibular teeth make contact with the palatal surfaces of the anterior maxillary teeth. The inclination of these surfaces determines the extent of the vertical component of mandibular movement. It is commonly believed that anterior movement is a variable feature and may be dependent on pathological processes such as caries, parafunctional habits, and loss of dental hard tissues not associated with caries

The aim of the study was to assess the relationship between the morphology of the dental arches and the activity of select muscles of the stomatognathic system in a group of young adults with full natural dentition.

The study included 162 individuals of both sexes, aged 18-21 with full natural dentition, Angle Class I, who were clinically examined. The examination assessed the range of vertical and horizontal overjet and the range of lateral movements of the mandible. Functional assessment was performed simultaneously and included an electromyographic analysis of the masticatory muscles and occlusion analysis. The electromyographic examination was carried out using a BioEMG system and included the examination of 4 pairs of muscles: masseters, anterior temporal muscles, sternocleidomastoids, and anterior bellies of the digastric muscles. Muscle activity was assessed in central occlusion and during lateral movements. Occlusion analysis was performed using a T-scan III device. Seating of both dental arches on the sensor enabled the assessment of occlusal parameters such as occlusion time and disclusion time with lateral movement to the right and left.

Anatomical impressions were then taken and diagnostic models were cast. The models were measured according to generally accepted guidelines: the length of the dental arches in the anterior-posterior dimension, the width between the canines, premolars, and molars,

and the circumference length of the dental arches. The obtained test results were statistically analyzed using Statistica 13.0.

Based on the conducted research, a statistically significant difference was found between female and male subjects in relation to the morphology of the maxilla and mandible. The muscular activity of the masseter muscles in central occlusion and eccentric movements of the mandible to the right significantly differed between the sexes. The muscular activity of the masseter muscles in central occlusion and eccentric movements of the mandible to the right as well as to the left positively correlated with the value of the overjet. The temporal muscles and digastric muscles also showed a positive correlation with overjet. It was also found that the morphology of the dental arches had a limited effect on the activity of the masticatory muscles.