Recently, specialists from many countries of the world have observed an increase in the prevalence of dentofacial anomalies in children and adolescents, which, in particular, is associated with urbanization processes and environmental degradation [4]. According to WHO, the incidence of dentofacial anomalies in the world is 92% [1]. One of the most common anomalies of the dentofacial apparatus in the late interchangeable occlusion is the violation of occlusion in the sagittal direction, namely, class II, according to Angle’s classification [7]. For the timely treatment of this pathology in the pubertal period, the early detection is necessary [9]. However, the results of epidemiological studies in different regions and countries are contradictory [1, 2, 6-8, 11], there is insufficient information on the structure of class II anomalies according to Angle’s classification with different types of lower jaw growth among 10-13 years old children. This necessitates a further study of the prevalence of dentofacial anomalies.

Purpose of the study - to study the structure of dentofacial anomalies in children and adolescents in Sumy city and Sumy oblast (Ukraine) by their applying. To identify the dentoalveolar morphological peculiarities of the occlusion in 10-13 years old patients with anomalies of class II, according to Angle’s classification with different types of lower jaw growth.

Material and methods. A retrospective analysis of 2236 outpatient dental cards of urban and rural patients with orthodontic pathology, which applied to the regional children’s clinical dental clinic (Ukraine), was conducted. Patients were divided into three age groups: 6-9 years old (early mixed occlusion) - 592 children; 10-13 years old (late mixed occlusion) - 1180 children; over 13 years old (permanent occlusion) - 464 persons (Fig. 1).

The form of dentofacial anomalies was established according to the Angle’s classification. Open and cross occlusions were divided in separate groups.

In addition, 76 patients with class II, anomalies according to Angle’s classification aged 10-13 years were examined in the clinic to determine the type of lower jaw growth. Children underwent an X-ray study, diagnostic models were made. In practical orthodontics, the most widely X-ray method of research is used [10], especially orthopantomography, which allows to carry out a detailed diagnosis, to select the strategy and tactics of orthodontic intervention, to control the stages and the final result of the treatment, depending on the direction of growth of the dentofacial apparatus, it allows the doctor to give a long-term prognosis [3, 12].

Orthopantomographic examination was performed to determine the type of lower jaw growth according to the procedure described by R. Reinhardt and others [13] (Fig. 2). All patients were divided into five groups, taking into account the type of lower jaw growth: group I - 21 patients with a neutral type of growth (LGo = 123±5º), group II - 11 children with vertical growth (LGo > 128º), group III - 9 patients with horizontal type of growth (LGo < 118º), group IV - 9 children with combined (neutral with vertical) type of growth, group V consists of 5 children with a combination of neutral and horizontal type of lower jaw growth. Total 152 measurements were made.

On the diagnostic models of the jaws, to determine the degree of the severity of morphological changes, the biometric indicators were calculated, since they are an important criterion for choosing a treatment tactics [5]. Morphometric examinations were carried out on 55 control-diagnostic models of the jaws of patients with a late mixed occlusion with dentofacial anomalies of class II according to Angle’s classification by the method of Linder-Hart, Korkhaus. Total 220 measurements were made.

The statistical processing of the material was carried out according to parametric criteria (mean value - M, standard error - m), statistical significance of the difference between the indices of two independent groups was carried out according to the parametric criterion (Student) using the statistical program package AtteStat 10.8.4. for MS Excel. Statistically significant differences were considered when p < 0.05.
Results and discussion. In the structure of dentofacial anomalies in patients of Sumy city and Sumy oblast, applying for orthodontic care, it is characteristic for all age groups that in a significant majority there are anomalies of individual teeth and dental curves (class I according to Angle's classification) and that is ranged from 67.95% to 77.87% of cases (Fig. 3).

On orthopantomograms it was found that in a significant number of examined patients the value of the jaw angles was $123\pm 5^\circ$, which corresponds to the neutral type of lower jaw growth (Table).

The neutral and combined types of growth were leading in boys, in girls more often the neutral ($LGo = 123 \pm 5^\circ$), vertical ($LGo > 128^\circ$) and horizontal ($LGo < 118^\circ$) types of lower jaw growth were observed.

Among the patients with the combined growth types a combination of neutral and vertical types of lower jaw growth was revealed in 63.16%, and a combination of neutral and horizontal types of growth was revealed in 36.84% of cases.

In the biometric study of the control and diagnostic models of the jaws, a symptom complex of morphometric indices of dental curves with dentofacial anomalies of class II according to Angle's classification, depending on the type of lower jaw growth, was established.

For patients with a neutral type of lower jaw growth, the width of the upper dental curve between the canines averages $31.72\pm 0.25$ mm at a norm of $32.47\pm 0.25$ (p=0.05) and a lower one average $25.86\pm 0.43$ mm at a norm of $24.40\pm 0.40$ mm (p<0.01); in the region of the first premolars on the upper jaw it averages $33.89\pm 0.54$ (p=0.001), on the lower jaw - 34.17±0.61 (p<0.001) at a norm of 37.05±0.58 mm and 37.05±0.58 mm respectively. It was found that the width in the region of the first permanent molars of the upper jaw is 45.05±0.78 mm at a norm of 48.35±0.78 mm (p=0.01), of the lower one it is 46.24±0.56 mm at a norm of 48.35±0.78 (p=0.05); the length of the frontal segment of the upper dental curve is 20.53±0.33 mm (p=0.001), of the lower dental curve - 15.1±0.4 mm (p=0.01) at a norm of 18.26±0.26 mm and 16.29±0.25 mm respectively.

For patients with a vertical type of lower jaw growth, the following results were obtained: the width of the upper dental curve in the region of 3/3 teeth is 33.86±0.67 mm (N=32.44±0.47 mm) (p=0.05), upper dental curve - 26.25±0.49 mm (N=24.44±0.47 mm) (p=0.01); the width between 4/4 teeth on the upper jaw is 33.9±0.54 mm (N=36.36±0.60 mm) (p=0.01), on the lower jaw 34.1±0.66 mm (N=36.36±0.60 mm) (p=0.05). Transversal dimensions in the region of 6/6 teeth on the upper jaw are 43.95±0.69 mm (N=46.69±0.84 mm) (p=0.01), on the lower jaw 44.52±0.50 mm (N=47.25±1.07 mm) (p=0.05); the length of the frontal part of the upper jaw is 19.12±0.52 mm (N=17.25±1.07 mm) (p<0.05), of the lower jaw - 13.9±0.41 mm (N=15.9±0.35 mm) (p=0.01).

Biometric study of the control and diagnostic models of the jaws of patients with horizontal growth showed that the width of the upper dental curve between the canines averaged 31.61

Table. Types of lower jaw growth in children according to orthopantomograms

<table>
<thead>
<tr>
<th>Sex</th>
<th>Neutral growth type</th>
<th>Vertical growth type</th>
<th>Horizontal growth type</th>
<th>Combined growth type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Boys</td>
<td>17</td>
<td>22.37</td>
<td>5</td>
<td>6.58</td>
</tr>
<tr>
<td>Girls</td>
<td>11</td>
<td>14.47</td>
<td>10</td>
<td>13.16</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>36.84±5.53</td>
<td>15</td>
<td>19.74±4.56</td>
</tr>
</tbody>
</table>

Fig. 2. Determination of the type of lower jaw growth

Fig. 3. The structure of dentofacial anomalies in 6 - 13 years old children

A total of 2236 (6-13 years and over)

With regard to occlusion anomalies, in the age group of 6-9 years old patients (early mixed occlusion), the most common is an open occlusion (7.44%), which can be explained by the presence of a large number of various harmful habits at this age.

At a later age (late period of mixed and permanent occlusion), there is a decrease in the number of patients with open occlusion and class III anomalies according to Angle's classification, which is most likely due to the elimination of bad habits at an earlier age and the eruption of permanent teeth.

The occlusion anomalies of class II according to Angle's classification progress with age, and their percentage increases almost 9 times (from 2.87% up to 19.18%) both in 10-13 years old children and in patients older than 13 years in comparison with the early mixed occlusion.
Among the occlusion anomalies in 10-13 years old children, a characteristic symptom complex of morphological changes in the dental curves of the upper and lower jaws of different severity was established. The most pronounced morphological changes are observed in the group of patients with a horizontal type of lower jaw growth.

REFERENCES


4. Куроедова В.Д. Комплексная оценка хирургии «зубо-челюстная аномалия» и прогноз ликвидации ортодонтических пациентов. Автореф. дис... д-р. мед. наук. Полтава: 1999; 32.

5. Попов С.А., Сатыбекова Е.А., Мечникова И.И. Трансверзальные изменения параметров зубных рядов у подростков с дистальной окклюзией при проведении ортодонтического лечения с удалением и без удаления отдельных зубов // Стоматология детского возраста и профилактика. - 2012. - № 2: 45-49.

6. Терехова Т.В., Зиновчик О.В., Бычковская Т.Н., Макейчик Т.В. Распространенность и структура зубочелюстных аномалий у городских детей Гомельской области 7-15 лет // Медицинский журнал. - 2016. - № 3: 130-134.


DEPENDENCE OF MORPHOMETRIC PARAMETERS OF THE DENTAL OCCLUSION ON THE TYPE OF THE LOWER JAW GROWTH IN CHILDREN WITH CLASS II DENTOFACIAL ANOMALIES WHO LINE IN THE NORTHERN UKRAINE

Galich L.V., Kuroedova V., Lakhtin Yu., Galich L.B., Moskalenko P.

The aim of the work was to study the structure of dentofacial anomalies in children and adolescents in Sumy city and Sumy oblast, to identify dental occlusal morphological peculiarities of the occlusion in 10-13 years old patients with class II anomalies according to Angle's classification with different types of lower jaw bone growth.

A retrospective analysis of 2236 outpatient dental cards of urban and rural patients with orthodontic pathology was conducted. Patients were divided into three age groups: 6-9 years old (early mixed occlusion) - 592 children; 10-13 years old (late mixed occlusion) - 1180 children; over 13 years old (permanent occlusion) - 464 persons; besides 76 patients with class II anomalies according to Angle's classification aged 10-13 years were examined. To determine the type of lower jaw growth, the children underwent orthopantomographic examination, diagnostic models were made and biometric indicators were calculated to determine the severity of the morphological changes.

It was established that anomalies of individual teeth and dental curve dominated in all age groups (71.24%). Among the occlusal anomalies, a large part falls to class II anomalies according to Angle's classification (19.18%). A third of these patients have a neutral type of lower jaw growth (36.84±5.53%), horizontal and vertical types of growth reach 18.42±4.47% and 19.74±4.56%, respectively. The combination of neutral and vertical type of growth of the lower jaw occurs in 1.7 times more than the combination of neutral and horizontal. The most pronounced morphological changes were observed in the group of patients with a horizontal type of lower jaw growth.

When planning treatment and prophylactic measures among patients of the orthodontic profile, it is necessary to take into account the peculiarities of both the prevalence of pathology in the region and the morphological changes of different severity in the dental curves of the jaws.

**Keywords:** dentofacial anomalies, prevalence of dentofacial anomalies, class II according to Angle's classification, growth of jaws, types of jaw growth, orthopantomography, morphometry.

SUMMARY

DEPENDENCE OF MORPHOMETRIC PARAMETERS OF THE DENTAL OCCLUSION ON THE TYPE OF THE LOWER JAW GROWTH IN CHILDREN WITH CLASS II DENTOFACIAL ANOMALIES WHO LINE IN THE NORTHERN UKRAINE

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