

Results of a follow-up study of occlusion status in Ukrainian schoolchildren

Wyniki dwuetapowego badania stanu zgryzu u dzieci w wieku szkolnym na Ukrainie

Maryna Dmytrenko, Oleh Nesterenko

Department of Orthodontics, Ukrainian Medical Dental Academy, Poltava, Ukraine
Zakład Ortodontcji, Ukraińska Akademia Medyczo-Stomatologiczna, Poltawa, Ukraina

Abstract

Introduction. Dental crowding complicates sagittal, vertical and transversal types of malocclusion and it is accompanied by aesthetic, functional and morphological disorders even at the early stages of occlusion formation. **Aim of the study.** To carry out follow up study of occlusion state of one schoolchildren group in period from temporary to permanent dentition in order to determine in age aspect frequency and mechanism of development of malocclusions, complicated by dental crowding. **Materials and methods.** Follow up study of occlusion state in 434 schoolchildren of Poltava aged from 6 to 11 years old (girls – 246 (56.68%), boys – 188 (43.32%)) was performed during six years. **Results.** The follow-up of one contingent of children confirms high (79.96%) prevalence of malocclusion in mixed dentition, which increases during permanent dentition to an average of 84.33%, that is to 4.37%. Orthodontic pathology in permanent dentition becomes more expressed and severe. Malocclusions complicated by dental crowding are the most widespread types, their frequency doubles within six years, mixed dentition – 33.54% permanent dentition – 68.67%. ($R\chi^2 < 0.05$). There is no statistically significant difference in factors of dental crowding presence in different types of malocclusion ($P\chi^2 > 0.05$). **Conclusions.** Frequency of the sagittal, vertical and transversal forms of malocclusion complicated by dental crowding was 33.54% in mixed dentition, and in six years it increased by 68.67% in permanent dentition.

Streszczenie

Wstęp. Stłoczenie zębów powoduje powikłanie strzałkowych, pionowych i poprzecznych rodzajów anomalii zębowo-szczękowych, a już na wczesnych etapach kształtowania się zgryzu towarzyszą mu zaburzenia estetyczne, funkcjonalne i morfologiczne. **Cel pracy.** Przeprowadzenie dynamicznej obserwacji stanu zgryzu jednej grupy uczniów w okresie od zgryzu zmiennego do stałego w celu określenia częstotliwości i prawidłowości rozwoju anomalii zębowo-szczękowych, powikłanych stłoczeniem zębów w aspekcie wiekowym. **Materiały i metody.** Przeprowadzono badanie dynamiczne stanu zgryzu 434 uczniów z Poltawy w wieku od 6 do 11 lat (dziewcząt – 246 (56,68%), chłopców – 188 (43,32%)) w ciągu sześciu lat. **Wyniki.** Przeprowadzone badanie dynamiczne jednej grupy dzieci potwierdza wysoką (79,95%) powszechność anomalii zębowo-szczękowych w zgryzie zmiennym, która wzrasta w okresie zgryzu stałego średnio do 84,33%, czyli o 4,37%. Patologia ortodontyczna w zgryzie stałym nabiera wyraźniejszych i cięższych form. Najpowszechniejsze są anomalie zębowo-szczękowe, powikłane ściśnięciem zębów, ich częstotliwość (w ciągu sześciu lat) wzrasta dwukrotnie: zgryz zmienny – 33,54%, zgryz stały – 68,67% ($P\chi^2 < 0,05$). Nie wykryto statystycznie wiarygodnej różnicy pomiędzy wskaźnikami obecności ściśnięcia zębów w zależności od rodzaju anomalii zębowo-szczękowej ($p > 0,05$). **Wnioski.** Częstotliwość strzałkowych, pionowych i poprzecznych form anomalii zębowo-szczękowych, powikłanych ściśnięciem zębów, w zgryzie zmiennym wynosiła 33,54%, a po sześciu latach – w zgryzie stałym – zwiększyła się do 68,67%.

KEYWORDS:

malocclusion, dental crowding, follow-up study

HASŁA INDEKSOWE:

wada zgryzu, stłoczenie zębowe, badanie dwuetapowe

Introduction

Dental crowding is abnormal construction of dentition (shape and size), characterized by close position of front teeth group, malalignment of individual teeth in the arch due to lack of space for their proper position.¹ In Ukraine and throughout the world children and adults have a high frequency of malocclusion, complicated by dental crowding, which, in the mixed dentition period, is up to 37.37% - 37.7%,^{2,3} and 54.24% - 78.4% in the permanent dentition.^{4,5} Dental crowding complicates sagittal, vertical and transversal types of malocclusion⁶ and it is accompanied by aesthetic, functional and morphological disorders even at the early stages of occlusion formation.^{1,7} Therefore, the problem of diagnostics and treatment of patients who were diagnosed with malocclusion with dental crowding, is still very topical despite the rapid development of advanced orthodontic technology.

The aim of the study is to carry out a follow-up study of occlusion state of one group of schoolchildren in periods from deciduous to permanent dentition in order to determine the frequency and mechanism of development of malocclusion complicated by dental crowding relative to age.

Material and Methods

Maxillofacial area of 434 schoolchildren (246 girls – 56.68%, and 188 boys – 43.32%) residing in the city of Poltava, Ukraine was studied for six years in periods from mixed to permanent dentition. Children were divided into groups depending on the period of occlusion formation. The first group was examined in the period of mixed dentition. The second group consisted of the same children, but examined after six years, that is in the period of permanent dentition. Mean age of the first group was 8.3 ± 0.06 and of the second group 14.34 ± 0.06 years. Evaluation of malocclusion was done according to Angle's classification and L.P. Grigorieva's classification.

Findings obtained in the study were processed by mathematical statistics methods. Chi-squared test (χ^2) was used to determine whether there is a significant difference of dichotomous indices. Analysis of non-parametric parameters relationship

was studied calculating Kendall rank correlation coefficient (τ (tau) test).

Results

The follow-up study of schoolchildren over a mixed dentition period showed that 347 (79.96%) of examined children had orthodontic pathology. In permanent dentition malocclusion amounted to 84.33% (366 children), indicating a 4.37% increase.

Angle's Class I malocclusion was diagnosed in 63.36% (275 individuals) during mixed dentition period. This figure has slightly decreased to 61.75% (268 individuals) in permanent dentition, but it was due to the increase of Class II rate of malocclusion. Distal bite was monitored in 14.05% (61 individuals) of the first group but in the period of permanent dentition Class II of malocclusion was revealed in 20.27% (88 individuals).

Class III was diagnosed in 11 children (2.53%) in the mixed dentition period. In permanent dentition this type of malocclusion was determined in 2.3% (10 individuals).

Studies have shown that the rate of deep bite has significantly increased. It was presented in mixed dentition – 16.35% (71 persons) and permanent dentition – 32.72% (142 persons), i.e. two times more. Frequency of cross-bite has generally increased 2.6 times in the period from mixed to permanent dentition – 6 (1.38%) patients in mixed dentition and 16 (3.69%) patients in permanent dentition. Open bite compared with other pathology was encountered much less frequently: in mixed dentition – 18 (4.15%) persons and in permanent dentition – 17 (3.92%) patients.

The most common abnormality in schoolchildren, as research has shown, is dental crowding of upper and lower arches, which complicated malocclusion in sagittal, vertical and transversal planes, and had a significant upward trend with age. It was determined that within six years the frequency of dental crowding increased twice ($P\chi^2 < 0.05$): mixed dentition – 33.54% permanent dentition – 68.67%.

The comparative analysis of results found no statistically significant difference between characteristics of dental crowding ($P\chi^2 > 0.05$)

Table 1. Frequency (%) of dental crowding in different types of malocclusion* (%)

Type of malocclusion	Period of dentition			
	mixed		permanent	
	dental crowding%	P	dental crowding%	P
Class I (Angle's classification)	61.76		76.87	
Class II (Angle's classification)	63.79	$P_{\chi^2} > 0.05$	65.91	$P_{\chi^2} > 0.05$
Class III (Angle's classification)	50.00		70.00	
Deep bite	54.41		66.18	
Open bite	58.82	$P_{\chi^2} > 0.05$	70.59	$P_{\chi^2} > 0.05$
Cross bite	50.00		77.78	

NOTE:

* —% refers to general number of examined children with different types of Angle's Class I, II, III malocclusion; deep, open, cross bite);

P — index of significant difference according to test χ^2 .

in different types of malocclusion, that is dental crowding complicated malocclusion in sagittal, vertical and transversal planes with almost equal frequency (Table. 1).

Discussion

The results conform with current research of Sayin M., Türkkahraman H.,⁶ who during examination of 1356 Turkish schoolchildren with malocclusion (793 girls, 563 boys) in the permanent dentition period have found that dental crowding accompanies Angle's Class I of malocclusion in 78.4%, Class II in 68%, and Class III in 69.2% of cases.

Conclusion

As a result of the follow-up study of the occlusion status of 434 schoolchildren of the city of Poltava, Ukraine within the period from mixed to permanent dentition, high rate of malocclusion in mixed dentition (79.96%) was determined. It increases during permanent dentition to 84.33% on average. Orthodontic pathology in permanent dentition becomes more manifest and severe. Frequency of sagittal, vertical and transversal forms of malocclusion complicated by dental crowding was 33.54% in mixed dentition, and in six years it increased to 68.67% in permanent dentition.

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- Address: ul. Shevchenko 23, 36011 Poltava, Ukraine
e-mail: dmitrenko25@mail.ru
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