

## ORIGINAL ARTICLE

# STUDYING THE RISK FACTORS OF CARIES IN THE FIRST PERMANENT MOLARS IN CHILDREN DEPENDING ON THEIR ODONTOGLIFICS

DOI: 10.36740/WLek202106134

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## ABSTRACT

**The aim:** To study the prevalence of odontoglyphic variants of the first permanent molars of the lower jaw in children 6-7 years old, as well as the frequency of caries lesions in molars with the most common types of patterns on their chewing surface.

**Materials and methods:** We studied 1092 mandibular molars in 564 children without background pathology at the age of 6-7 years. The dynamics of the occurrence of fissure caries was studied in 347 first permanent molars of the lower jaw for 2 years and 246 molars in 155 children from among those observed during 3 years of the study.

**Results:** In the children examined by us, the most common types of the chewing surface of the first permanent molars of the lower jaw were Y5- and + 5 patterns. We did not find a difference in the frequency of occurrence of these types in the surveyed girls and boys ( $p > 0.05$ ).

Our study showed that most often the first permanent molars of the lower jaw were affected by caries in the first 2 years of follow-up. The incidence of affection of the lower molars, which had a more complex structure of the occlusal surface (type Y5 and +5), was significantly higher than that of molars with the type of chewing surface +4.

**Conclusions:** It has been established that in children 6-7 years old, the first permanent molars of the lower jaw have a more complex structure of the chewing surface, and the intensity of their caries damage is maximally high in the first two years after eruption and require active additional preventive measures in the early terms after their eruption.

**KEY WORDS:** odontoglyphic, fissure caries, prevention, intertubercular fissures

Wiad Lek. 2021;74(6):1475-1477

## INTRODUCTION

Currently, in pediatric dentistry, the most acute problem is fissure caries in the first permanent molars, which erupt in children first among all permanent teeth and are most often affected by caries soon after their eruption [1,2,3]. Among the many factors leading to the development of caries, the features of odontoglyphics are distinguished [4,5]. Morphological studies [6] in the lower molars of a group of crowns with three pits at Y5 and Y6 patterns, as well as a group with two pits at +5 and Y4- patterns of the occlusal surface.

Morphometric studies made it possible to assert that the most susceptible to caries is the Y5-pattern of the chewing surface of the lower molars, which is characterized by the presence of 3 pits. At the same time, some researchers [5] did not reveal a significant difference between the affection of the lower molars with + - and Y-pattern of the occlusal surface.

Thus, the literature data indicate that there is a direct dependency between the complexity of odontoglyphics in molars and the occurrence of fissure caries in them. Still, there is no consensus on the frequency of lesions of the first permanent molars, depending on the type of chewing surface, although this is an important criterion for determining the indications for preventive measures.

## THE AIM

To study the prevalence of odontoglyphic variants of the first permanent molars of the lower jaw in children 6-7 years old, as well as the frequency of caries lesions in molars with the most common types of patterns on their chewing surface.

## MATERIALS AND METHODS

To solve the set tasks, a study of 1092 mandibular molars was performed in 564 children without background pathology at the age of 6-7 years. The examination was performed in the children's dental clinic. The type of pattern of the chewing surface of the teeth was determined according to the schemes of odontoglyphic variants of the molars of the upper and lower jaws proposed by A.P. Gasiuk. and P.N. Skripnikov (2001) [6].

The odontoglyphic pattern of molars was studied in intact teeth that did not show signs of initial forms of caries after staining the occlusal surface with 2% methylene blue solution for better visualization.

To study the frequency of caries lesions of the first permanent molars, depending on their odontoglyphics, a group of 6-year-old children was selected from the surveyed

**Table I.** Distribution of mandibular permanent molars by their odontoglyphics

Observation period (years)	Amount of children	Amount of molars				
		Totally	Type			
			Y5	+5	+4	
2	78	101	54	43	4	
3	155	246	137	92	17	
Totally	233	347	191	135	21	

children, consisting of 233 people, whose molars had the most common types of chewing surface. The dynamics of the onset of fissure caries was studied in 347 first permanent molars of the lower jaw for 2 years and 246 molars in 155 children from among those observed during 3 years of the study.

The data obtained were processed by the method of variation statistics. The assessment of the reliability of differences in indicators was carried out using the method of differences. Differences were considered significant at  $p \leq 0.05$ .

## RESULTS

A clinical study of 1,092 first permanent mandibular molars with an intact occlusal surface showed that most often they had a 5-tubercular crown (93.22%) compared to a 4-tubercular (5.86%) and 6-tubercular (0.92%). 5-tubercular molars with a Y-pattern were dominated by those with a +- pattern of the chewing surface, which amounted to 61.10% and 38.90%, respectively. 4-tubercular molars, on the contrary, more often had a + - pattern of the occlusal surface, compared with a Y-pattern (78.12% and 21.88%, respectively). 6-tubercular molars in 100% had a Y-pattern of the occlusal surface.

5-tubercular and 6-tubercular molars with a Y-pattern of the occlusal surface had three fusion fossae of inter-tubercular fissures: central-anterior ( $\alpha$ ), central-posterior ( $\beta$ ), and central-central ( $\gamma$ ). 4-tubercular molars with a Y-pattern and 5-tubercular molars with a + - pattern of the occlusal surface had two fossae – central anterior ( $\alpha$ ) and central-posterior ( $\beta$ ), 4-tubercular molars with a + - pattern had one fossa.

The most common type of occlusal surface of the lower molars was Y5-pattern (56.96%), other types in frequency of occurrence were distributed in the following sequence: type +5 (36.26%), type +4 (4.58%), type Y4 (1.28%), type Y6 (0.92%).

Thus, in the children examined by us, the most common types of the chewing surface of the first permanent molars of the lower jaw were Y5- and +5 patterns. We did not find a difference in the frequency of occurrence of these types in the surveyed girls and boys ( $p > 0.05$ ).

The dynamics of the onset of fissure caries was studied in 347 first permanent mandibular molars for 2 years and 246 molars from among those observed for 3 years, which had the most common types of occlusal surfaces (Table I).

After 6 months of observation, 9 out of 347 molars were affected by caries, which amounted to  $2.59 \pm 0.85\%$ . In the lower molars with Y5- and +5- patterns of the chewing sur-

face, caries was diagnosed equally often ( $p > 0.05$ ), ( $2.09 \pm 1.04\%$  and  $3.7 \pm 1.62\%$ , respectively), and in molars with +4 chewing surface pattern, no cases of caries were found.

After 12 months of observation, out of 347 molars, 29 were affected, which amounted to 8.36%. New cavities were found in 20 mandibular molars. In teeth with a +4 pattern of the chewing surface, caries was not detected, and the frequency of damage to molars with Y5- and +5- patterns was the same ( $p > 0.05$ ) ( $8.38 \pm 2.00\%$  and  $9.63 \pm 2.54\%$  respectively).

The results of the study after 24 months showed that out of 347 intact molars, 59 were affected, which amounted to 17%. New cavities were found in 30 molars. There was no significant difference between the affection of the lower molars with Y5- and +5- patterns of the chewing surface ( $p > 0.05$ ) ( $17.80 \pm 2.77\%$  and  $18.52 \pm 3.34\%$  respectively) all molars with +4 - patterns were intact.

In the group of children, from among the observed who were examined for 3 years, there was a similar, above described, tendency of affection of permanent molars in the period of 6-24 months of the study. After 36 months of observation, 58 of 246 molars were affected, which amounted to 23.48%. New cavities were found in 10 teeth. There was no significant difference between the affection of the lower molars with Y5- and +5 patterns of the chewing surface ( $p > 0.05$ ) ( $27.01 \pm 3.79\%$  and  $22.83 \pm 4.38\%$ , respectively), and molars with +4- pattern of the occlusal surfaces remained intact.

Thus, our study showed that most often the first permanent molars of the mandible were affected with caries in the first 2 years of follow-up. During the 3rd year of the study, there was a tendency towards a decrease in the intensity of molar damage. The incidence of affection of the lower molars, which had a more complex structure of the occlusal surface (type Y5 and +5), was significantly higher than that of molars with the type of chewing surface +4. We did not find any difference between the affection of molars with Y5- and +5 patterns of the chewing surface.

## DISCUSSION

The data published in this paper are the result of research aimed at studying the prevalence of odontoglyphic variants of the first permanent mandibular molars in children 6-7 years, as well as the frequency of caries of molars with the most common types of pattern on their masticatory surface.

The relevance of scientific research is determined by the fact that the treatment of caries of temporary teeth was and

remains an extremely important and complex task of pediatric dentistry, because the carious process in the hard tissues of temporary teeth spreads quite quickly [5, 7]. Therefore, untimely or ineffective dental intervention can lead to further development of caries or its complications, and, as a consequence, to the removal of temporary teeth, death of the rudiments of permanent teeth, occlusion disorders [3, 8, 9]. Due to this, caries of temporary teeth requires constant monitoring with appropriate changes in the correction of disorders that occur at the level of the oral cavity [1,2,5]. Also of great importance in the development of carious process in temporary teeth is the shape of the teeth, the structure and topography of molar fissures, etc., the study of which is facilitated by various research methods, including odontoglyphics [6, 10]. In addition, the viability of this development is due to the tendency to a steady increase in the number of children with this pathology [3,4,8, 9].

## CONCLUSIONS

Since in children 6-7 years old, the first permanent molars of the lower jaw have a more complex structure of the chewing surface, and the intensity of their caries damage is the highest in the first 2 years after eruption, they require additional preventive measures in the early stages after their eruption.

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*The work is a fragment of the research Scientific research work «Improvement of methods of prevention and treatment of diseases of hard tissues of teeth and periodontal tissues on the background of somatic pathology in children, taking into account socio-economic factors and psycho-emotional state» state registration number 0119U102852.*

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## Conflict of interest:

*The Authors declare no conflict of interest.*

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**Received:** 03.11.2020

**Accepted:** 22.04.2021

A - Work concept and design, B - Data collection and analysis, C - Responsibility for statistical analysis, D - Writing the article, E - Critical review, F - Final approval of the article