

Evaluation of Permanent Tooth Eruption Patterns in a Local Community of School Children

Muica (Nagy-Bota) Monica-Cristina¹, Oltyán Zsuzsa², Păcurar Mariana², Brînzaniuc Klara³

¹ PhD candidate, University of Medicine and Pharmacy, Tîrgu Mureş, Romania

² Department of Pedodontics and Orthodontics, University of Medicine and Pharmacy, Tîrgu Mureş, Romania

³ Department of Anatomy and Embryology, University of Medicine and Pharmacy, Tîrgu Mureş, Romania

Purpose: Due to the fact that in the past years we are dealing with more cases of atypical dentition, the authors propose an evaluation of the eruption sequence of permanent teeth in a community of school children.

Material and method: For this evaluation there have been examined 200 children, students at “Alexandru Ioan Cuza” gymnasium. The examined children were both in urban and rural and with ages between 9 and 12 years old, representing the permutation period of the dental support area. The clinic study (intraoral examination) was completed by X-ray examination in cases of atypical eruption, with the absence of the permanent tooth at the age that he should have been present on the dental arch.

Results: The results presented in tables and figures show that the normal sequence of the tooth eruption is presented in a lower percentage (28.5%) of the examined cases. The highest percentage is represented by the atypical tooth eruption (71.5%). Also we observed the existence of three atypical sequences by changing the classical order of the support area teeth: canine, first premolar, second premolar.

Discussions: Although our results were not statistical significant, they still show a changing in the classic eruption sequence. atypical sequences are more frequent in urban area due to more intensive process of industrialization and super refined food fast alimentation.

Conclusions: Classic pattern of eruption in maxilla and mandible has suffered in recent years a number of changes, with early appearance on the poorly developed dental arches of the teeth in the support area.

Keywords: tooth eruption, teeth permutation, support area, deviation

Introduction

Tooth eruption is a phenomenon of growth correlated with tooth development which takes place according to a genetic pattern. The tooth eruption represents the final stage of the odontogenesis in which the teeth formed in the maxillary bone thickness cross the distance between the places they developed until they get in contact with their antagonists.

The tooth eruption begins in the moment when the tooth crown is fully formed and the root is partially developed (a third to maximum half of the full length of the tooth root) [1].

The dental eruption pictures the last stage of the odontogenesis and is a phenomenon represented by teeth migration from alveolar bone into the oral cavity. The eruption process begins when the tooth crown is mineralized, followed by an intraosseous phase and then an intraoral phase.

Permanent teeth eruption takes place in the context of maxillary bones growth and development, of the general somato-psychic development of the child for a period of 12–13 years, time in which the dynamic phases alternates with the molding phases and finalized by permanent dentition occlusion [2, 3].

Material and method

For the eruption sequence evaluation of the teeth from the support area we evaluated 200 children. The children were divided in two groups: one group with 100 boys, 80 boys from urban area and 20 boys from rural area, and the second group with 100 girls, 70 from urban area and 30 from rural area, with ages between 9–12 years old. We took in

consideration this age interval because in this period the teeth permutation from the support area takes place. The clinic study consisted in an intraoral examination of the oral cavity of every child, followed by a complementary X-ray examination. We used panoramic radiographs, retroalveolar and bite-wing radiographs in the cases we suspected a dental inclusion. For the results statistical analysis Fisher test was used.

Results

From the 200 children chosen for this study we noticed a normal tooth eruption in a low percentage of 29% for the boys and 29% for the girls (Table I). Meanwhile it was noticed a high percentage of the cases with atypical eruption as well as for boys (71%) as for girls (72%) (Table II).

The normal eruption sequence of the permanent maxillary dentition is: first premolar, second premolar and canine.

The normal eruption sequence of the permanent mandibular dentition is: canine, first premolar and second premolar.

In the case of the atypical eruption we noticed three atypical sequences (Table III).

Sequence 1 of the permanent maxillary dentition is: second premolar, canine, first premolar and for the permanent mandibular dentition is: first premolar, canine, second premolar. This sequence was noted in 23% cases of boys and 25% cases of girls, with a high incidence in the children the urban area (Table IV).

Sequence 2 of the permanent maxillary dentition is: canine, second premolar, first premolar and for the permanent mandibular dentition is: first premolar, second pre-

Table I. The frequency of the tooth normal eruption regarding the sex both in urban and rural area

	Female	Male
Urban	19	23
Rural	9	6

molar, canine. This sequence was noted in 21% cases of boys and 21% cases of girls, with a high incidence in the children the urban area.

Sequence 1 of the permanent maxillary dentition is: second premolar, first premolar canine, and for the permanent mandibular dentition is: canine, second premolar, first premolar. This sequence was noted in 27% cases of boys and 26% cases of girls, with a high incidence in the children the urban area.

Comparing the cases of normal and atypical tooth eruption in boys (Table IV) both in urban and rural we obtained following the statistic test Fisher, $p = 1.000$ ($p > 0.05$) considered statistical not significant. A similar result we obtained in the cases of normal and atypical tooth eruption in girls both in urban and rural, $p = 0.8105$ ($p > 0.05$) considered statistical not significant.

Discussions

Although our results were not statistical significant, they still show a changing in the classic eruption sequence, a change in the order of appearance in the dental arch of the various groups of teeth. The atypical sequences are more frequent in urban area due to more intensive process of industrialization and super refined food fast alimentation. Also an important role is represented by the excessive consumption of sweets, which has repercussions as early appearance of dental caries and the loss of the teeth before the physiological permutation leading to the change of the normal sequence of tooth eruption. Usually these cariogenic factors occur before tooth preresorption, but a diet high in carbohydrates may also act after tooth resorption, during the odontogenesis [4].

The sequence of tooth eruption of the teeth from the support area, canine and premolars, is subdued to the widest variations. The factors that influence the moment of the permanent teeth eruption are:

- Sex by the earlier emergence in girls compared to boys;
- Socio-economic factors – the teeth erupt earlier in the children who come from areas with good economic conditions;

Table III. The frequency of the three atypical sequences of the tooth eruption regarding the sex both in urban and rural area

	Female			Male		
	Sequence 1	Sequence 2	Sequence 3	Sequence 1	Sequence 2	Sequence 3
Urban	18	13	20	21	14	22
Rural	7	8	6	2	7	5

Table II. The frequency of the tooth atypical eruption regarding the sex both in urban and rural area

	Female	Male
Urban	51	57
Rural	21	14

- Urbanization effect – accelerated eruption in children from urban areas [5].

A similar study on a group of children realized in Izmir (Turkey) shows that the superior canine eruption precedes in most of the cases the eruption of the second premolar [6]. This trend of the tooth eruption is subdued to a large variability, depending on eating habits, infrastructure and environment.

Other studies carried out in north-east of Malaysia [7] regarding tooth eruption sequence show a gap between the two jaws in that the eruption of the inferior teeth precede with more than 1 year the eruption of their superior counterparts. The results from both studies show an acceleration of the tooth eruption in girls compared with boys. The same results were obtained in our study also.

Studies carried out in Korea [8], Northern Ireland [9] and United States of America [10] showed the same classic eruption sequence of the inferior teeth as we showed in our study. Meanwhile in the case of the superior teeth eruption sequence the studies showed the following sequence: first premolar, canine, second premolar.

Conclusions

1. Tooth eruption is a physiological phenomenon that takes place within a defined time with complex mechanisms subdued to a large variability.
2. Classic pattern of eruption in maxilla and mandible has suffered in recent years a number of changes, with early appearance on the poorly developed dental arches of the teeth in the support area.
3. Our research revealed three atypical eruption sequences of permanent teeth with more weight in females in urban areas.
4. Tooth eruption monitoring is an essential factor in preventing tooth crowding dentomaxillary disharmonies, any delay of the tooth eruption leading to a major dentomaxillary imbalance such as: tooth inclusion or transposition, ectopic teeth.

Table IV. The frequency of the tooth normal and atypical eruption regarding the sex both in urban and rural area

	Tooth normal eruption	Tooth atypical eruption
Female in urban area	19	51
Female in rural area	9	21
Male in urban area	23	57
Male in rural area	6	14

References

1. Bratu D – Aparatul dentomaxilar. Ed Helicon Timisoara, 1990.
2. Stanciu D, Scantei Dorobat V – Ortodontie. Ed.Medicala Bucuresti, 1991.
3. Philippe J – Orthodontie des principes et une technique, Julien Prelat, Paris, 1972
4. Iliescu A, Gafar M – Cariologie si odontoterapie restauratoare.Ed.Medicala Bucuresti, 2003
5. Zarnea L – Pedodontie. Editura Didactica si Pedagogica, Bucuresti, 1993
6. Wedl JS, Schoder V, Blake FAS, Schmelzle R, Friedrich RE – Eruption times of permanent teeth in teenage boys and girls in Izmir(Turkey).Journal of Clinical Forensic Medicine 2004, 11: 299–302
7. Nizam A, Naing L, Mokhtar – Age and sequence of eruption of permanent teeth in Kelantan, North-Eastern Malaysia. Clin oral Invest 2003, 7:222–225.
8. Cheong CS, Jung YH, Cho BH – The timing of tooth eruption and root development of permanent canine and premolars in Korean children. Korean Journal Maxillifac Radiol 2004, 40: 131–135.
9. Kochhar R., Richardson A – The Chronology and sequence of eruption of human permanent teeth in Northern Ireland. Int J Paediatr Dent 8 1998, 4: 243–52.
10. Smith B., Holly Garn, Stanley M – Polymorphisms in eruption sequence of permanent teeth in American Children. American Journal of Physical Anthropology 74, 1987, 3: 289–303.