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Standards for permanent teeth emergence time and sequence in Lithuanian children, residents of Vilnius city

Ruta Almonaitiene, Irena Balciuniene, Janina Tutkuviene

SUMMARY

Background. Up-to-date population specific standards on the timing and sequence of emergence of the permanent teeth are essential in planning medical care for children. To the best of authors' knowledge, data about emergence time of permanent teeth in Lithuanian children has not been provided.

Objective. To provide the first standards of permanent teeth emergence time and sequence in Lithuanian children, citizens of Vilnius.

Material and methods. In a cross-sectional study, data were collected from 3596 Lithuanian children, 4 to 16 years of age in randomly selected kindergartens and secondary schools of Vilnius city. During dental examination all erupted permanent teeth, except third molars, were recorded. MiniTab15 statistical software was used to calculate clinical eruption time of permanent teeth. Different comparisons were made to detect inter-jaw, inter-gender and inter-population differences.

Results. The earliest teeth to erupt in both genders are lower central incisors around the age of six. The first stage of mixed dentition ends with the eruption of upper lateral incisors around the age of 8 in boys and a half of year earlier in girls. Second transitional period starts after the emergence of first premolars or lower canine in girls and upper first premolar in boys at the age of 9.5. The last tooth to erupt in both genders is the upper second molar at the age of twelve.

No significant differences have been found between right and left sides in either jaw. Lower permanent teeth tended to emerge significantly earlier than the upper ones, except for premolars and first molars. Girls preceded boys by 4 to 5 months on average. Lithuanian children on average showed earlier emergence time, especially in premolars, but resemble German and Finnish populations more closely.

Conclusions. No significant asymmetry in permanent teeth emergence time has been found in either jaw. Lower permanent teeth, showed earlier clinical eruption than in the upper jaw in both genders. Lithuanian girls were clearly advanced in permanent teeth emergence than compared to boys.

Lithuanian children showed earlier permanent teeth emergence time, especially in premolar region, than children from other countries.

Key words: permanent teeth, emergence time, children, Lithuanians.

INTRODUCTION

Tooth eruption is defined as the movement of a tooth from its site of development within the alveolar process to its functional position in the oral cavity (1). The whole process is divided into five stages, one of which being mucosal penetration or emergence of any visible part of a tooth into oral cavity. This particular stage of tooth development, sometimes called clinical tooth eruption, had always been of particular interest to various specialists and scientists because knowledge of teeth emergence chronology and sequence is essential in children healthcare planning and numerous fields of clinical dentistry such as preventive and pediatric dentistry, orthodontics and oral surgery. They are also supplemental to other maturity indicators in establishing children age in forensic medicine when birth records are unknown or missing.

Timing of teeth emergence differs from population to population and can be affected by genetic and environmental factors. Both ethnic origin and gender can be attributed to genetic factors and there is an

[1]*Institute of Odontology, Faculty of Medicine, Vilnius University*
[2]*Vilnius University Hospital, Zalgiris Clinic*
[3]*Department of Anatomy, Histology and Anthropology, Faculty of Medicine, Vilnius University*

***Ruta Almonaitiene*[1]** *– PhD student*
***Irena Balciuniene*[2]** *– D.D.S., PhD, Hab. Dr., prof.*
***Janina Tutkuviene*[3]** *– M.D. PhD, Hab. Dr., Prof.*

Address correspondence to Ruta Almonaitiene, Institute of Odontology, Faculty of Medicine, Vilnius University; Zalgirio str. 115, 08217 Vilnius, Lithuania.
E-mail address: rutaalmonaitiene@hotmail.com

agreement between studies that emergence of permanent teeth in African black children is earlier than compared to Caucasian or Asian counterparts (2-4). Another aspect on which most of the researches agrees is that girls are more advanced in permanent teeth development and emergence time than boys (5-11).

According to the literature, numerous environmental conditions are said to influence clinical eruption time of the permanent teeth. They can be further subdivided into two categories: general, such as body composition, nutrition, the intake of fluorides, socio-economic level or season of birth and local, such as primary teeth caries and its sequels, early loss of predecessor, crowding in dental arch or trauma to both primary and developing permanent tooth. While general factors affect not only developing dentition but also the human body as a whole, they are most likely to be associated with the changes of clinical tooth eruption time of all teeth, as dental development and emergence is a physiological process and should go hand in hand with general development. This statement can be proved by the results of different studies which show although slight but still advancement of dental development in taller and heavier children (12-14). Nutrition effects on timing of teeth emergence can be considered in two different ways: if fatness is taken into account, a positive but only slight relationship can be found between weight and dental development (12-13) , but if we consider effects of stunting or wasting as a result of a deficient nutrition, it is clear that eruption of both primary and permanent teeth will be delayed, except for earlier eruption of first permanent incisors and first permanent molars, which can show either earlier or later than normal emergence time (15-17).

Socioeconomic variables can also modify the dynamics of teeth eruption in a way that children from higher socioeconomic class and living in a city rather than rural district will be advanced in permanent teeth emergence, although the difference is being minimal and statistically insignificant (18, 19).

The impact of fluorides on permanent teeth emergence time is under debate. While some works reported delayed teeth emergence up to 10 months during second transitional phase in children, living in areas with high fluoride concentrations in the drinking water (20) , others have found only minimal and clinically insignificant delay up to 2-3 months (21) or even no effect of systemic fluorides on permanent teeth emergence time (22). It also should be pointed out that the association between the intakes of fluorides on permanent teeth emergence is smaller than the impact of caries experience in primary teeth (21).

Primary teeth decay and its sequel affects both the order and the time of permanent teeth emergence (9, 21). Emergence time of permanent premolars and canines are most likely to be modified by the caries in primary teeth, although several studies concluded that early extraction of second primary molar or caries experience in primary molars could accelerate the clinical eruption of permanent second molars (23). Usually the effect is to promote clinical eruption of permanent dentition regardless the type of caries experience (decayed, filled, pulp therapy, extracted) has occurred in a predecessor tooth (24). Nevertheless some of the conditions such as pulp therapy and very early loss or extraction due to caries of the primary tooth could possibly retard the emergence of permanent tooth (25, 26). Actually, the boundary between very early loss and early loss cannot be simple drawn and it seems that the effect on timing of emergence will depend on several factors such as primary tooth pathosis, permanent tooth bud position, chronological age at tooth loss, overlying bone thickness and available space in the dental arch acting altogether (27, 28).

Secular trend towards earlier emergence of almost all permanent teeth have been documented during last century (11, 20, 29). The average increase in mean age at eruption of all teeth is although small, accounting for 1.5 days per year for boys and 2.6 days per year for girls, but statistically significant (11). Premolars are exception to this phenomenon since they show later clinical eruption due to dramatically decreased caries prevalence and improved oral health among children in the last decades. It is interesting finding that acceleration of permanent teeth emergence actually is reported in studies which included children born until 1986-1990 years, while results of later researches either show only minimal

Table 1. Types of prosthetic treatment and percent of persons whom this treatment was attached

Age midpoint (years)	Range (months)	Girls n	Boys n	Total n
4	42-53	99	99	198
5	54-65	103	106	209
6	66-77	108	121	329
7	78-89	118	143	261
8	90-101	128	112	240
9	102-113	145	134	279
10	114-125	144	128	272
11	126-137	158	169	317
12	138-149	198	191	389
13	150-161	204	200	404
14	162-173	188	189	377
15	174-185	115	93	208
16	186-197	105	98	203
Total		**1813**	**1783**	**3596**

(23) or no acceleration during last decades (30) or even report a delay in permanent teeth emergence time (5, 6).

As timing of permanent teeth emergence can be modified by such a variety of factors, it becomes important to acquire accurate chronological eruption parameters from population in which they are to be used. Little information is available regarding dental parameters in Lithuania. To the best of the author's knowledge, data about emergence time of permanent teeth in a Lithuanian child population has not been provided. For that reason, dentist working in Lithuania have still been referring to standards available in the textbooks of clinical dentistry (31).

The aim of this study was to provide the first standards of permanent teeth emergence time and sequence in Lithuanian children, citizens of Vilnius.

MATERIAL AND METHODS

For this cross-sectional study on craniofacial growth and timing of permanent teeth emergence, data were collected from 3596 Lithuanian children: 1813 girls and 1783 boys from 4 to 16 years of age, living in Vilnius city. All participants were healthy and did not suffer from any systemic illnesses. The study was approved by Lithuanian Bioethics Committee and carried out by one investigator in randomly selected twelve kindergartens and eight secondary schools during period of 2007-2009 and 2010-2011. Through the school/kindergarten administrations, informed consent forms were sent to the parents of each child. Only children, whose one of the parent has signed the form, could participate in the study. Parents of each participant were asked to fulfill a questioner regarding child's ethnicity, exact birth date, general health and growth during early childhood, current general and dental health status, nutrition habits and socio-economical factors. According to standardized anthropometric methods (Martin and Saller 1957) , 48 direct craniofacial measurements were taken on each participant. During dental examination under natural light with dental mirror all erupted permanent teeth, except third molars, were recorded. A tooth has been recorded as "emerged" if any part of it has penetrated the oral mucosa and became clinically visible. The age of a child was calculated by subtracting date of birth from the child's examination date and dividing by number of days in the year. The children were divided into 13 chronological age groups with one – year intervals. Distribution of the subjects according to age and gender is presented in Table1.

Although the study concerns both craniofacial growth and clinical eruption of permanent dentition, this paper will address permanent teeth emergence time and sequence only.

In order to calculate median as well as 5th and 95th percentiles of clinical eruption time for all permanent

Table 2. Median eruption times (years) for maxillary permanent teeth in Lithuanian children (including 5th and 95th percentiles)

Tooth	No of tooth (FDI)	Right side			No of tooth (FDI)	Left side	
		Emergence time	Females	Males		Females	Males
Central incisor	11	Median (confidence interval)	6.75 (6.64-6.87)	6.89 (6.78-7.0)	21	6.74 (6.62-6.85)	6.84 (6.73-6.95)
		5th-95th percentiles	5.61-7.9	5.74-8.04		5.69-7.98	5.77-8.10
Lateral incisor	12	Median (confidence interval)	7.55 (7.43-7.66)	7.96 (7.83-8.08)	22	7.51 (7.37-7.63)	7.97 (7.86-8.08)
		5th-95th percentiles	6.36 – 8.96	6.70-9.44		6.20-9.08	6.83-9.10
Canine	13	Median (confidence interval)	10.51 (10.38-0.64)	11.09 (10.96-11.22)	23	10.48 (10.35-10.60)	11.02 (10.89-11.15)
		5th-95th percentiles	8.54-12.48	9.12-13.06		8.76-12.53	9.22-13.18
First premolar	14	Median (confidence interval)	9.51 (9.37-9.65)	9.91 (9.76-10.05)	24	9.55 (9.41-9.69)	9.87 (9.73-10.02)
		5th-95th percentiles	7.36-11.67	7.75-12.06		7.36-11.73	7.69-12.06
Second premolar	15	Median (confidence interval)	10.63 (10.49-10.77)	10.82 (10.68-10.97)	25	10.61 (10.46-10.75)	10.98 (10.84-11.12)
		5th-95th percentiles	8.29-13.27	8.48-13.17		8.20-13.02	8.57-13.39
First molar	16	Median (confidence interval)	6.26 (6.15-6.38)	6.41 (6.30-6.52)	26	6.20 (6.09-6.30)	6.45 (6.34-6.55)
		5th-95th percentiles	5.13-7.40	5.27-7.55		5.32-7.07	5.48-7.59
Second molar	17	Median (confidence interval)	12.08 (11.96-12.20)	12.32 (12.19-12.44)	27	12.04 (11.92-12.16)	12.26 (12.14-12.38)
		5th-95th percentiles	10.10-14.07	10.33-14.30		10.12-13.96	10.34-14.19

teeth, except third molars, all subjects were divided according to chronological age into 4 month group intervals.

Within each age group, "emerged" cases were counted for a given tooth, which represented the "response frequency" value. While all subjects in a given age group represented the "total observed" output. These data were imported into Minitab 15 statistical program for probit regression analysis. The assumption was made that the eruption ages have a normal distribution in order to calculate the lower and upper limits of the 95% confidence interval median eruption age.

The median values of emergence were compared using 95% confidence intervals and the difference was considered to be statistically significant if the confidence interval of one median value did not overlapped the values of comparable confidence interval.

RESULTS

The median ages of emergence of all the permanent teeth, excluding third molars, in boys and in girls for upper jaw are provided in Table 2 and for lower jaw – in Table 3. In addition, the 5th and 95th percentiles are presented, indicating the range within which 90 per cent of values within the sample fell. Data are given for both right and left sides, although no significant differences in timing of teeth emergence between them has been found.

The earliest permanent teeth to emerge just before the 5 years of age were lower central incisor for girls and mandibular first molar for boys. If a median eruption age is taken into consideration, then the first transitional period of mixed dentition starts with the eruption of lower central incisors in both genders, although the difference in time of emergence between central incisors and first molars is minimal in boys but is significant in girls. The last tooth to erupt in both genders is maxillary second molar at the age of twelve.

All teeth in lower jaw tended to emerge earlier than the corresponding teeth in the upper jaw in both genders, except premolars in boys and first premolars in girls. These teeth showed later but not significant median emergence time in mandible. The significant differences have been found in timing of eruption of incisors, canines and second molars between jaws in males and of permanent first right molar in addition to the mentioned teeth in females. The emergence ages of incisors and canines showed the biggest intermaxillary differences up to 9 and 8 months respectively in boys, while even bigger differences up to 11 months were noted between lower and upper central incisors and canines in girl sample.

Lithuanian girls were clearly advanced in their permanent tooth emergence compared with boys, the difference in median age ranging from 1 to 10 months, depending of tooth type. Differences between genders

Table 3. Median eruption times (years) for mandibular permanent teeth in Lithuanian children (including 5th and 95th percentiles)

Tooth	No of tooth (FDI)	Right side			No of tooth (FDI)	Left side	
		Emergence time	Females	Males		Females	Males
Central incisor	41	Median (confidence interval)	5.82 (5.71-5.93)	6.07 (5.97-6.18)	31	5.87 (5.75-5.98)	6.13 (6.02-6.23)
		5th-95th percentiles	4.75-6.89	5.00-7.15		4.75-6.99	5.02-7.42
Lateral incisor	42	Median (confidence interval)	6.83 (6.70-6.95)	7.22 (7.10-7.34)	32	6.86 (6.73-7.0)	7.20 (7.09-7.31)
		5th-95th percentiles	5.72-8.15	6.06-8.59		5.39-8.33	6.04-8.37
Canine	43	Median (confidence interval)	9.51 (9.38-9.63)	10.35 (10.23-10.48)	33	9.58 (9.45-9.71)	10.37 (10.25-10.50)
		5th-95th percentiles	7.72-11.29	8.57-12.14		7.78-11.38	8.57-12.17
First premolar	44	Median (confidence interval)	9.60 (9.47-9.73)	10.11 (9.97-10.25)	34	9.65 (9.51-9.79)	10.12 (9.99-10.26)
		5th-95th percentiles	7.86-11.73	8.31-12.30		7.63-11.67	8.11-12.14
Second premolar	45	Median (confidence interval)	10.60 (10.46- 10.74)	11.07 (10.93-11.20)	35	10.56 (10.41-10.70)	11.06 (10.92-11.20)
		5th-95th percentiles	8.30-12.91	8.76-13.37		8.15-12.96	8.65-13.46
First molar	46	Median (confidence interval)	6.09 (5.98-6.20)	6.29 (6.17-6.41)	36	5.99 (5.89-6.10)	6.21 (6.09-6.33)
		5th-95th percentiles	5.06-7.12	4.95-7.63		5.10-7.05	4.87-7.55
Second molar	47	Median (confidence interval)	11.26 (11.14-11.38)	11.64 (11.52-11.76)	37	11.28 (11.16-11.41)	11.69 (11.57-11.81)
		5th-95th percentiles	9.36-13.16	9.74-13.54		9.28-13.29	9.68-13.70

in time of permanent teeth in ascending order are presented in Table 4.

For most of the examined teeth, the differences between girls and boys were statistically significant. Only first permanent molars, maxillary central incisors and second molars and maxillary right second premolar exhibited minimal difference between genders. Maximum difference was observed in timing of canine emergence: boys tended to have their mandibular canines emerging 10 months and maxillary canines 7 months later than girls.

First transitional period of mixed dentition starts at the median age of 5 years and 10 months and ends at 7 years and 6 months in girls. Second transitional period begins with clinical eruption of first premolar in the upper jaw at the age of 9.5 years and continues until the emergence of the upper second molar at the age of twelve. Although both transitional periods start and end later in males (at the age of 6 years and 1 month until 8 years and 9 years 10 months and 12 years 4 months accordingly) , their duration is more or less the same in both genders, actually the second transitional period is even shorter by two months in males (2 years and 7 months for girls and 2 years and 5 months for boys).

Differences between males and females have been observed in permanent teeth emergence sequence in both jaws too. In mandible the order of teeth eruption in boys is as follows: central incisors, first molars, lateral incisors, firs premolars, canines, second premolars and second molars. For girls canines emerge ahead of first premolar, otherwise the order is the same as in boys. Maxillary teeth have the following emergence sequence in male sample: first molar, central incisor, lateral incisor, first premolar, second premolar, canine, second molar. For girls the difference exists in canine eruption, it appears in the oral cavity after the first premolar and so the order of permanent teeth emergence is as follows: first molar, central incisor, lateral incisor, first premolar, canine, second premolar, second molar. But it should be pointed out that the difference in the median age of emergence between mandibular central incisors and first molar in boys as well as the difference between mandibular first premolar and canine in both genders is minimal and not statistically significant. This means that earlier mentioned teeth can change positions with each other in the sequence row. The same is to be applied for maxillary second premolar and canine in both sexes.

Table 4. Gender difference (months) in the median ages of permanent teeth emergence

Tooth No (FDI)	Difference	Tooth No (FDI)	Difference
21	1.2	47*	4.56
11	1.68	42*	4.68
16	1.8	14*	4.8
46	2.4	12*	4.92
15	2.4	37*	4.92
27	2.64	22*	5.52
36	2.76	45*	5.52
17	2.76	34*	5.64
41*	3.0	35*	6.0
31*	3.12	44*	6.12
26*	3.12	23*	6.48
24*	3.84	13*	6.96
32*	4.08	33*	9.48
25*	4.44	43*	10.08

* Indicates significant difference ($p<0.05$)

If we consider dynamics or period of eruption, which refers to the time needed for particular tooth to erupt completely and can be established from the interval between 5th and 95th percentile, it can be clearly seen that the permanent teeth of the first transitional period have shorter period of eruption than compared to the teeth of second transitional period. The average value for any tooth eruption period in the first stage of mixed dentition is 2 years and 4 months, while the average duration of eruption of any tooth in the second stage is 4 years 2 months. The values are almost the same for males and females. The shortest time, 1.75 years, is found for maxillary left first molar in girls and the longest one – 4.98 years for the right second premolar in girls too. On average first permanent molars and lower central incisors were found to have the shortest periods while the second premolars had the longest ones.

DISCUSSION

There are some limitations in this type of cross-sectional study of tooth emergence. The first one was that no radiographs were done to confirm tooth agenesis or impaction. Therefore it is possible that some teeth may have been incorrectly recorded as unerupted rather than missing. Likewise, teeth recorded as congenitally missing might have been still unerupted or extracted or avulsed. Nevertheless, these sorts of recoding errors are unlikely to have biased the results of the study, given the relative large size of the sample. This statement can be proved by the results of one study which investigated the impact of an unknown proportion of congenitally missing teeth on the computation of tooth emergence ages and concluded that although there is a tendency towards later estimates in median emergence time, biased estimates are avoided in adequate sample size (32). Given the fact that agenesis of lower second premolars and maxillary lateral incisors are the most frequent (33, 34) , hence the median ages of emergence of lateral maxillary incisors and mandibular second

premolars were most likely to be increased slightly by lack of radiographic documentation.

The second limitation was that the effect of both premature loss and caries experience in primary teeth could not be evaluated in this cross-sectional study. In order to investigate such a relationship between predecessor and permanent dentitions, either longitudinal design of study should be employed or retrospective data on dental history should be available. Retrospective data on dental history were not available because national health system dealing with dental issues in Lithuania is scattered over both public and private practice and therefore there were no central database of dental records. Longitudinal study approach would be ideal in evaluating developing permanent dentition but such study design also has a number of limitations as it is elaborate, expensive to run, require long period to complete, sample size is relatively small and participants may quit study at any time. Besides, several works confirmed that data from cross-sectional studies, which are simpler to carry out and can cover large sample of subjects with less expenses and efforts, are reliable and can be used while studying time of tooth emergence (11). However, only median time instead of mean time of emergence through probit either logit regression models could be calculated in a cross-sectional study approach. The more recent studies have used this statistical approach to investigate teeth emergence time (7, 30, 35). Although most of the mentioned studies divided subjects according to chronological age into 1 year intervals and therefore could possibly introduced some errors by making some subjects either 6 month older or younger, the sample of this study was divided into 4 months intervals as in one study on permanent teeth emergence time in Finland (7). One more reason to divide subjects in such a way is that the process of emergence is quite short and it is helpful to have smaller intervals of chronological age to capture it more accurately. In this way it could be easier to detect even minor differences in timing of emergence between different teeth.

Our findings revealed that the permanent teeth emerged at similar times on the right and left sides, which are consistent with the results of previous studies in different populations (5-7, 10, 11, 19, 23). The fact that permanent teeth in the lower jaw precede corresponding maxillary teeth is also in agreement with other works (5, 7, 8, 10, 18, 30). All mandibular teeth, except premolars and first molars (with the exception for the first right molar in girls) in both genders showed statistically significant earlier eruption with the range between one and 9 months. The same significant differences were noted in one recently done study (35), while other works just reported the existing difference without testing significance.

The inter-gender differences were also noted: girls precede boys in timing of emergence of all teeth, especially in canine eruption time, and only few of them do not differ in terms of statistical significance. The X-chromosome linkage to tooth formation as the reason for difference in timing of teeth development between genders has been proposed by scientists in 1965. Then they have found that intra-girl correlations for tooth formation timing and as they stated "developmental timings

Table 5. Comparison of the median emergence age for boys

Tooth No. (FDI)	Current study Vilnius. Lithuania	Finland Eskeli R. et al. 1999	Belgium Leroy et all. 2003	Westfalen (Germany) Friedrich et al. 2005	Barcelona (Spain) Hernandez M. al. 2008	Colchester (United Kingdom) Elmes A. et al. 1998-2001	Zagreb (Croatia) Rajic Z. et al. 2000	Izmir (Turkey) Wedl J.S. et al 2002	Jordania Shaweesh A.I. 2011
11	6.89	6.8	7.08	6.7	7.17	7.42	7.5	7.1	7.25
12	7.96	8.08	8.25	8	8.21	8.81	8.54	7.93	8.45
13	11.09	11.34	11.53	11.2	11.63	11.98	11.65	10.84	11.56
14	9.91	10.92	10.73	10.5	10.86	9.96	10.33	10.24	10.45
15	10.83	11.72	11.62	11.4	11.48	12.25	10.76	10.99	11.37
16	6.41	6.3	6.31	6.2	6.28	6.77	6.83	5.94	6.35
17	12.31	12.39	12.27	12.5	12.48	12.8	12.62	12.24	12.61
41	6.13	6.03	6.27	6.3	6.29	6.6	6.62	6.56	6.48
42	7.2	7.05	7.36	7.1	7.52	7.76	7.66	7.6	7.51
43	10.37	10.5	10.57	10.5	10.61	11	10.95	10.15	10.63
44	10.12	10.69	10.62	10.5	10.65	11.19	10.61	10.24	10.54
45	11.06	11.56	11.72	11.4	11.66	12.21	10.9	11.01	11.73
46	6.21	6.21	6.33	6.1	6.32	6.76	6.6	6.03	6.24
47	11.69	11.96	11.90	11.7	11.96	12.26	11.91	11.85	12.19

of all kinds" were higher than the comparable intra-boy correlations and the correlations between sisters were also higher than compared to brother-brother or brother-sister correspondence rate (12). If we consider clinical significance, it is interesting to note that although both first molars and maxillary second molars emerge more or less on the same time in both genders, mandibular second molars erupt at about 5 months later in boys compared to girls. This fact must be taken into consideration in planning prophylactic dental procedures for children.

The order of permanent teeth emergence in both jaws was generally consistent with other studies (7, 35, 36) and the first teeth to erupt were central incisors in mandible and first molar in maxilla, the same as reported in other European countries (7, 8, 36, 37). Boys had the most unfavorable teeth emergence sequence in terms of possible dental crowding of in the maxillary arch. They showed a trend towards canine eruption after the first and second premolars and this predisposes the shortage of space in dental arch for canines.

Tables 5 and 6 depict a comparison of the median emergence ages of Lithuanian children with those of other populations.

It can be seen that the median emergence ages of Lithuanian children resemble the medians of German and Finnish children more closely than the others. Overall permanent teeth emergence seems to be earlier in Lithuanians than in other populations. Special attention must be paid to premolars, which in Lithuanians emerge up to one year earlier and this difference can be associated with high incidence of caries in primary teeth in Lithuania (38).

To the best of the author's knowledge, this study is the first of its kind to provide chronological standards of permanent tooth emergence in the Lithuanian children. Although the study was carried out on the residents of Vilnius city, the study sample size represented about 5% of Lithuanian children 4 to 16 years of age living in that area. Vilnius is a capital of Lithuania and therefore majority of its population can be considered as a mix of Lithuanian people which migrated from different parts of Lithuania to Vilnius. For this reason the presented emergence time of permanent teeth in this paper, maybe with some caution, can be applied to all Lithuanian children.

CONCLUSIONS

No significant asymmetry in permanent teeth emergence time has been found between right and left sides of either jaw.

Lower permanent teeth, except premolars, showed earlier clinical eruption than their counterparts in the upper jaw in both genders.

Lithuanian girls were clearly advanced in permanent teeth emergence than compared to boys, minimum difference of one month has been found between maxillary central incisors and the maximum one of 10 months has been observed between lower canines.

Lithuanian children than compared to children from other countries, showed earlier permanent teeth emergence time, especially in premolar region and the closest timings of permanent teeth emergence are in

Table 6. Comparison of the median emergence age for girls

Tooth No. (FDI)	Current study Vilnius. Lithuania	Finland Eskeli R. et al. 1999	Belgium Leroy et all. 2003	Westfalen (Germany) Friedrich et al. 2005	Barcelona (Spain) Hernandez M. al. 2008	Colchester (United Kingdom) Elmes A. et al. 1998-2001	Zagreb (Croatia) Rajic Z. et al. 2000	Izmir (Turkey) Wedl J.S. et al 2002	Jordania Shaweesh A.I. 2011
11	6.75	6.75	6.85	6.7	6.89	7.17	7.19	7.26	7.11
12	7.55	7.64	7.84	7.5	7.37	8.24	8.3	8.01	8.07
13	10.51	10.81	10.91	10.9	10.95	11.39	11.09	10.49	11.09
14	9.51	10.32	10.31	10.1	10.36	10.85	10.15	10.26	10.01
15	10.63	11.59	11.26	11.1	11.15	11.78	10.7	11.01	11
16	6.26	6.13	6.14	6.1	6.16	6.5	6.86	6.17	6.2
17	12.08	11.9	11.95	11.9	12.24	12.4	12.42	12.33	12.32
41	5.87	5.85	6.11	6.3	6	6.36	7.19	6.71	6.32
42	6.86	6.82	7.07	6.8	7.26	7.4	7.24	7.55	7.34
43	9.58	9.74	9.68	9.5	9.79	10.29	10.03	9.96	9.84
44	9.65	10.27	10.17	10.1	10.29	10.71	10.37	10.21	10.12
45	10.56	11.32	11.28	10.9	11.28	11.87	10.88	11.12	11.2
46	5.99	6.1	6.17	6.1	6.09	6.46	6.98	6.23	6.08
47	11.28	11.59	11.55	11.2	11.46	11.95	11.79	11.9	11.66

Finnish and German populations.

Special attention should be paid to earlier emergence of premolars, especially in the upper jaw, and the inter-gender difference in the clinical eruption of the second permanent molars when planning both prophylactic procedures and orthodontic treatment.

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