

## Development of the Tooth System of Children from the Region of the South-East Rhodopi Mountains

*S. Tineshev*

*Faculty of Biology, Paisii Hilendarski University of Plovdiv  
Department of Human Anatomy and Physiology*

The purpose of the present study is to determine the times of cutting for the particular teeth categories in age-sexual aspect, to analyze the sequence of their cutting, as well as to determine the average age of appearing of the particular teeth categories in children and adolescents at the age from 7 to 17 years.

*Key words:* teeth, upper jaw, lower jaw.

### Introduction

Studying the development of a child's organism, it is of high importance to take in consideration the period of permanent teeth cutting, as this is the period in which an organism forms and develops. The age of cutting is a basic criterion for estimating the general physical development of a child, and together with the other factors, it is an indicator of the physiological maturity of an organism. In series of research, it has been reported the interdependency between processes of permanent teeth cutting and ossification [2], environmental effects on the age and sequence of cutting [1], the morphological features of teeth [3, 4, 5]. It is hard to find complete data about permanent teeth cutting in separate territorial groups of children. Having in mind this, we made it our aim, even though partly, to fill this incompleteness with our own research into children from the South-East Rhodopi Mountains.

### Material and Methods

The subjects of observation were 1480 children and adolescents (781 boys and 699 girls) from the municipalities Lyubimets, Svilengrad and Ivaylovgrad at the age from 7 to 17 years. The groups were formed in one-year turned ages.

We scoped and recorded the quantity of permanent teeth, as we assumed each tooth as a cut one if its crown had appeared in the gum, irrespectively of its level. The start, the end and the average age of cutting of the permanent teeth categories were deter-

mined by the methods of Danilkovich (1967). For determining the average number of permanent teeth we used a descriptive statistics, and for determining the average age and the times of cutting – non-linear probe regression analysis.

## Results

As it can be seen in Table 1, the teeth of the lower jaw develop earlier in comparison with the upper jaw and we could see it during the whole period of observation and in both genders. The process of cutting of the particular permanent teeth categories practically ends at the age of 15-16 years. The table also shows that cutting happens earlier with girls than with boys. These differences can be seen during the whole growth period, especially between the ages 10-12 when the quantity of the permanent teeth of 10-year-old girls is 17.47, and at the age of 12-23.56. In boys, a similar process can be seen a year later and the maximum addition in the total quantity of permanent teeth is between the ages of 11 and 12 – from 18.80 to 22.60.

The curves of the percentage growing of the particular permanent teeth categories show that there are periods of an active cutting and periods of delay, and it can be seen clearly with the increase and decrease of the yearly addition of the permanent teeth.

In the right half of the maxilla (Figs. 1, 2, 3, 4) in both genders, the canine tooth sprouts earliest – at the age of 7. In girls at the age between 9 and 10, this tooth can be seen in 50% of the cases and it sprouts completely at the age between 12-13 years. In boys, it happens a year later. The other categories of permanent teeth sprout during the 9<sup>th</sup> year. Although these teeth appear simultaneously, they develop at a different rate. The first premolar and the second molar have a more intensive rate of sprout in boys, and the sprout rate of the second premolar is comparatively the same in both genders. In the left half of the maxilla (Figs. 5, 6, 7, 8), there are inter-sexual differences in the beginning of cutting of the canine which cuts 2 years earlier in girls, and the first premolar which cuts a year earlier. Both teeth have a longer rate of development. The initial age of cutting of the second premolar and the second molar is the same in both genders. There are lateral differences regarding the initial age of cutting of the both premolars which cut earlier in the left half.

Table 1. Quantity of permanent teeth

Age	N	Permanent teeth												
		Maxila		Mandibula		General		N	Maxila		Mandibula		General	
		X	SD	X	SD	X	SD		X	SD	X	SD	X	SD
		Boys							Gvrls					
7	52	3.59	1.84	4.84	1.70	8.43	1.77	51	3.86	1.92	5.06	1.34	8.92	1.63
8	59	4.37	1.42	5.59	0.76	9.96	1.09	57	5.38	1.50	5.75	0.89	11.13	1.20
9	93	5.81	1.35	6.55	1.19	12.36	1.27	76	6.42	1.13	7.01	1.49	13.43	1.31
10	60	8.51	2.78	8.53	2.07	17.04	2.43	84	8.36	1.84	9.11	1.83	17.47	1.84
11	68	9.16	2.44	9.64	1.08	18.80	1.76	74	9.83	2.41	10.93	1.64	20.76	2.03
12	58	10.74	2.68	11.86	2.04	22.60	2.36	60	10.98	2.33	12.58	1.82	23.56	2.08
13	63	12.39	2.47	12.12	2.66	24.51	2.57	57	13.26	1.97	13.92	1.89	26.18	1.93
14	81	13.23	1.87	13.85	2.07	26.08	1.97	84	13.44	1.65	13.94	1.92	26.60	1.79
15	61	13.67	0.17	13.84	1.09	27.51	0.63	82	13.96	1.51	13.99	2.03	27.95	1.77
16	51	13.97	0.14	14.00	0.00	27.97	0.07	88	14.00	0.00	14.00	0.00	28.00	0.00
17	52	14.00	0.00	14.00	0.00	28.00	0.00	68	14.00	0.00	14.00	0.00	28.00	0.00

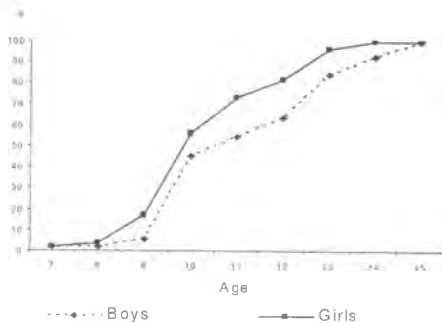


Fig. 1. Maxila dextra C

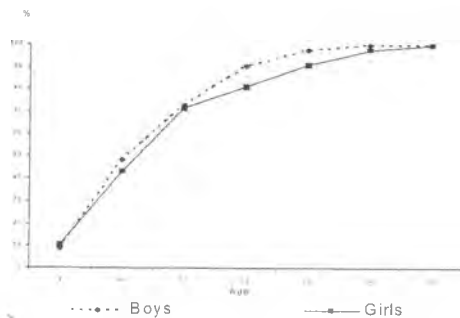


Fig. 2. Maxila dextra P1

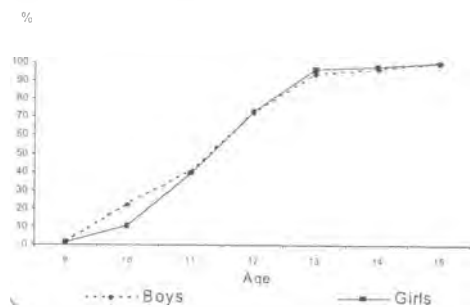


Fig. 3. Maxila dextra P2

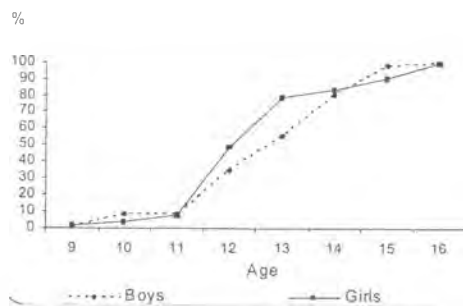


Fig. 4. Maxila dextra M2

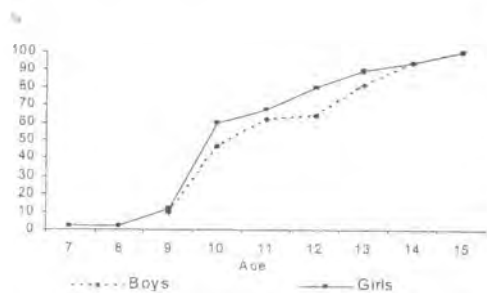


Fig. 5. Maxila sinistra C

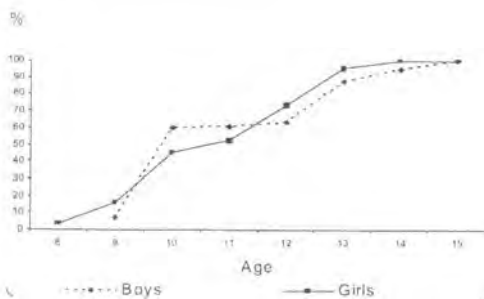


Fig. 6. Maxila sinistra P1



Fig. 7. Maxila sinistra P2

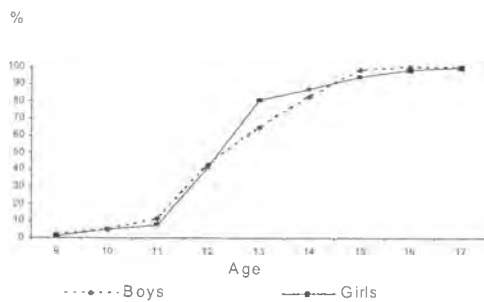


Fig. 8. Maxila sinistra M2

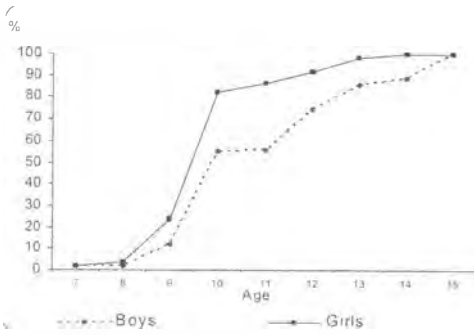


Fig. 9. Mandibula dextra C

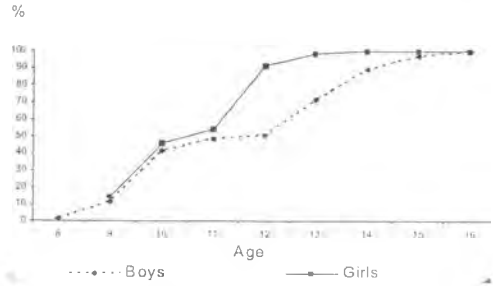


Fig. 10. Mandibula dextra P1

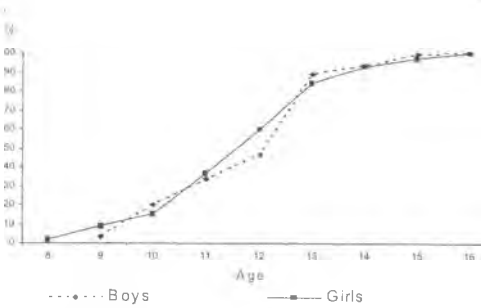


Fig. 11. Mandibula dextra P2



Fig. 12. Mandibula dextra M2

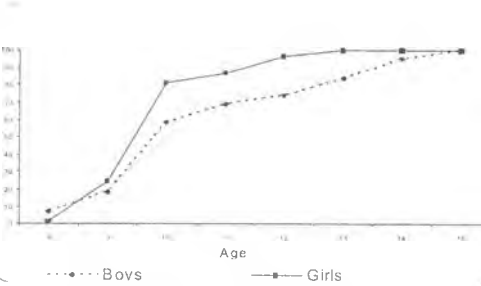


Fig. 13. Mandibula sinistra C

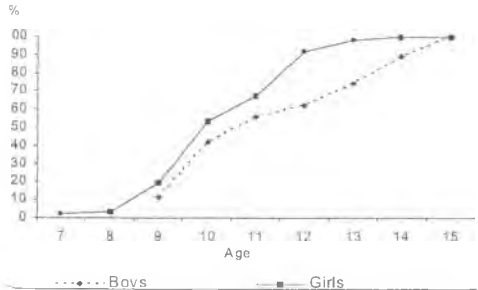


Fig. 14. Mandibula sinistra P1



Fig. 15. Mandibula sinistra P2

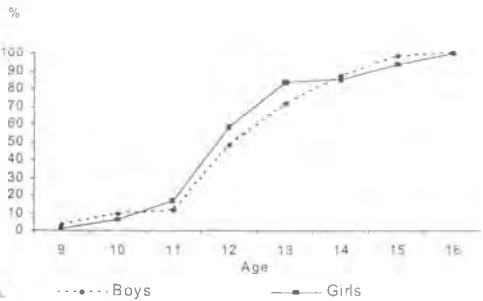


Fig. 16. Mandibula sinistra M2

♂	M2,P1,C,P2	C,P1,P2,M2
	M2,P2,P1,C	C,P1,M2,P2

♀	M2,P2,P1,C	C,P1,P2,M2
	M2,P2,C,P1	C,P2,P1,M2

Figs. 17, 18. The order of appearance of the teeth

In the right half of the mandible (Figs. 9, 10, 11, 12) in both genders, again the canine tooth cuts earliest – during the 7<sup>th</sup> year in 2% of the children we observed. In girls in the age period between 8 and 10 years, there is an intensive rate of cutting and it is obvious with the leap in frequency of occurrence – from 3 to 85%. In girls between the ages 12 and 13, this tooth has sprouted in 100% of the cases. In boys, the rates of cutting are longer in time and between the age of 14 and 15 it has sprouted in all boys we observed. The first premolar and the second molar cut earlier in boys, and the second premolar – in girls. There are sexual differences in the rates of cutting only with the first premolar and it has a longer rate in boys than in girls.

In the left half of the mandible (Figs. 13, 14, 15, 16) we did not find sexual differences in the start of cutting of the canine, the second premolar and the second molar. Only the first premolar cuts 2 years later in boys. There are lateral differences only regarding the start of cutting of the teeth observed and it occurs later in the left half, while their intensity of cutting is similar in both halves of the jaw.

The duration of sprout of the particular permanent teeth categories is different in both genders. In boys, the longest period of growing is this of canines and the first premolar; the second premolar has the shortest time of cutting. In girls, the longest period of cutting is this of both premolars; the second molar of the maxilla has the shortest time of sprout, while of the mandible – the canine.

The order of appearance of the teeth in both jaws (Fig. 17, 18) shows that in boys in the mandible and in the right half of the maxilla the canines sprout earliest, then it follows the first premolar, while in the left half the second premolar is the first followed by the canine. In the right half of the mandible, the second molar sprout earlier than the second premolar, while in the left half it is the contrary. In girls, there can not be seen an asymmetry in the sequence of sprout of the permanent teeth in the two halves of the maxilla. In the right half of the mandible the canine sprouts first, followed by the second premolar, while in the left half the first premolar sprouts first and then the canines.

Analyzing our results, we can assume that throughout the observed age period in both genders the average number of permanent teeth is bigger in the lower jaw compared with the upper jaw and it is bigger in girls in comparison with boys. The sequence of sprout of the particular permanent teeth categories shows lateral and inter-sexual differences. The duration of the cutting period of the teeth we observed is shorter in girls in comparison with boys because of the more intensive rate of cutting in them. The times and the average age of cutting of the teeth we observed fluctuate depending on the gender and it is different for the particular permanent teeth categories. In both genders, between the age of 15 and 16 all categories of permanent teeth cut.

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