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Teeth Eruption in Children with Normal Occlusion and Malocclusion

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A B S T R A C T

The aim of this study was to assess the differences in eruption of permanent teeth (C, P_1, P_2 and M_2) in a group of children with and without malocclusion. A sample of 1758 children (921 boys and 837 girls), aged 8–13 was randomly selected. The subjects were grouped by chronological age (11 groups) and by presence of malocclusion. Statistically significant differences were found for both, upper and lower canines in the age group 11 ($p<0.01$). Statistically significant difference was found in the age group 8.5 for upper first ($p<0.05$), upper second premolars ($p<0.01$) in the age group 10, and the lower second premolars in the age group 11 ($p<0.05$). Premature loss of deciduous teeth caused early eruption of succedaneus permanent teeth, possibly leading to development of a malocclusion.

Key words: *teeth eruption, normal occlusion, malocclusion*

Introduction

Eruption of teeth is important part of the process of growth and development of the craniofacial system. It is influenced by hereditary and environmental factors[1–5].

The time of eruption, the order and the time intervals between the eruptions, as well as intact deciduous teeth in the C-Pm_2 segment are all important factors for the regular positioning of the permanent canine and both premolars (C, P_1, P_2) into the dental arch and development of regular jaw relationships[6–11].

The aim of this study was to assess the differences in eruption of permanent teeth (C, P_1, P_2 and M_2) in the group of children with and without malocclusion.

Material and Methods

A sample of 1758 children (921 boys and 837 girls), aged 8–13 was randomly selected from population that attended Dental Health Clinic in Rijeka, Croatia.

The subjects were grouped by chronological age (11 groups) and by presence of malocclusion (Table 1). The subjects with normal occlusion exhibited dental Class I occlusal relationship. Subjects with clefts and syndromes were excluded from the examination, as were those who had previously any kind of orthodontic treatment.

The children were examined in the dental office and all information was recorded on a standardized examination form, including sex, age, presence of malocclusion

TABLE 1
DISTRIBUTION OF SUBJECTS

Age	Malocclusion	Normoclusion
8	169	51
8.5	96	31
9	182	51
9.5	76	33
10	158	64
10.5	83	30
11	185	51
11.5	92	47
12	188	58
12.5	38	10
13	39	26

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TABLE 2
DIFFERENCES IN THE ERUPTION TIME OF MAXILLARY CANINES, PREMOLARS AND SECOND MOLARS IN SUBJECTS WITH AND WITHOUT MALOCCLUSION

Age	Occlusion	C	p	P_1	p	P_2	p	M_2
8	m	0		16		5		0
	n	0		2		1		0
8.5	m	1		16	p<0.05	91		0
	n	0		0		31		0
9	m	3		48		155		2
	n	1		10		47		1
9.5	m	5		32		59		7
	n	4		17		26		1
10	m	23		92		92	p<0.01	13
	n	11		30		45		2
10.5	m	21		56		44		10
	n	9		19		11		0
11	m	62	p<0.01	152		64		28
	n	31		42		19		11
11.5	m	56		79		26		28
	n	32		41		13		22
12	m	142		180		30		89
	n	49		52		11		28
12.5	m	31		37		5		21
	n	9		8		3		6
13	m	35		37		4		30
	n	25		26		2		22

m – malocclusion, n – normal occlusion

and presence of C, P_1, P_2 and M_2. Every tooth with a visible part of the crown in the mouth was registered as erupted. The eruption times were recorded only for C, P_1, P_2 and M_2, because of their significance in development of the normal occlusion in all three dimensions, as well for normal maxillo-mandibular jaw relationships.

X^2 test was used to determine differences between the presence of C, P_1, P_2 and M_2 in different age and occlusion groups[12].

Results

Differences in the eruption time of permanent canines, premolars and second molars in subjects with and without malocclusion are presented in tables 2 and 3. Statistically significant differences for the canines were found in the age group 11, for both upper and lower jaw ($p<0.01$). In both cases the children with malocclusion had more erupted canines than those with normal occlusion.

Also, statistically significant difference was found in the age group 8.5 ($p<0.05$) where the children with malocclusion had a larger number of erupted upper first premolars.

For the second premolars, statistically significant differences were found for upper ($p<0.01$) in the age group 10, and for lower ($p<0.05$) in the age group 11, where the children with malocclusion had a larger number of erupted second premolars (Table 2 and 3).

Discussion

Development of malocclusion can be influenced by hereditary as well the environmental factors. The skeletal pattern or relationship of the jaw bases is largely under genetic control[6]. The foundations of many malocclusions are laid down at the moment the ovum is fertilized and there is not much that dentistry can do about that[1]. The regular placement of teeth into dental arch is related to available space. The space for the normal eruption of C, P_1 and P_2 is in most cases provided by intact or well-treated deciduous teeth[10,11]. There are particular times when developing malocclusion can be identified. The first is shortly after completion of the deciduous dentition at 3 years, the second is about 7–9 years when the first permanent molars and the permanent incisors should be erupting, and the third is about 11–12 years when the premolars, second molars and canines should be coming into the oral cavity. In Croatian population, the placement of C, P_1 and P_2 into the dental arch is still too often

TABLE 3
DIFFERENCES IN THE ERUPTION TIME OF MANDIBULAR CANINES, PREMOLARS AND SECOND MOLARS IN SUBJECTS WITH AND WITHOUT MALOCCLUSION

Age	Occlusion	C	p	P_1	p	P_2	p	M_2
8	m	3		8		2		0
	n	1		2		1		0
8.5	m	4		8		4		0
	n	0		1		2		0
9	m	28		36		24		2
	n	4		9		7		0
9.5	m	22		24		19		6
	n	8		13		6		1
10	m	68		66		50		18
	n	29		28		20		6
10.5	m	50		54		33		22
	n	17		19		13		4
11	m	135	$p<0.01$	131		94	$p<0.05$	67
	n	44		42		36		20
11.5	m	77		76		58		46
	n	41		41		33		28
12	m	177		168		145		147
	n	56		55		49		46
12.5	m	36		35		27		29
	n	9		9		7		7
13	m	39		38		35		36
	n	25		26		24		24

m – malocclusion, n – normal occlusion

disturbed by a premature loss of deciduous teeth and loss of space[13]. In addition to the loss of space in the dental arch, the premature loss of deciduous teeth often causes disorders in the rhythm of mineralization and eruption of permanent teeth[5,14–16]. The development, eruption and placement of C, P_1, P_2 and M_2 into dental arch can be accompanied by hypodontia, delated mineralization, a malposition of the germ in the bone and altered path of eruption[17–22]. All these factors, together with hereditary influence, can lead to development of malocclusion[23,24]. In this study we found that all subject with malocclusion exhibited earlier eruption of maxillary and mandible permanent teeth (C, P_1, P_2 and M_2). Statistically significant difference was found at the age of 8,5 for maxillary first premolars, at the age of 10 for maxillary second premolars. In eruption of canines statistically significant difference was found at the age of 11 for both upper and lower jaw. At the same age the significant difference was also found for lower second premolars. Almost all authors[25–27] agree that in patients with malocclusion there is earlier eruption of permanent teeth, but there are differences in opinions about exact time of eruption. In this age of prevention, most dentists encourage good dietary habits and practice local and general caries prevention. No less important is examination of the patient for the early signs of malocclusion.

Conclusion

Premature loss of deciduous teeth can cause early eruption of permanent teeth that may lead to development of a malocclusion.

The fact that these ages of special vigilance exist leads us to propose that the population should be screened at these developmental ages.

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NICANJE ZUBI U DJECE S NORMALNOM OKLUZIJOM I MALOKLUZIJOM

S A Ž E T A K

Cilj ovog istraživanja bio je utvrditi razlike u nicanju trajnih zubi (C, P_1, P_2 i M_2) u ispitanika s normalnom okluzijom i malokluzijom. Uzorak se sastojao od 1758 djece izabrane metodom slučajnog uzorka (921 dječak i 837 djevojčica) dobi od 8 do 13 godina. Ispitanici su podijeljeni u 11 dobnih i dvije skupine s obzirom na stanje okluzije. Statistički značajne razlike pronađene su u dobi od 11 godina za očnjake u obje čeljusti ($p<0,01$). U dobi od 8,5 godina statistički značajne razlike pronađene su za gornje prve premolare ($p<0,05$). Za gornje druge premolare statistička značajnost pronađena je u dobi od 10 ($p<0,01$), a za donje u dobi od 11 godina ($p<0,05$). Prerani gubitak mliječnih zubi vodi preuranjenom nicanju trajnih, što može uzrokovati razvoj ortodontske anomalije.