

Determination of Primate Space on 4 to 5 Years Old Children of Tehran's Kindergarten in 2000

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Statement of Problem: Nowadays, evaluation of the development of occlusion in deciduous teeth for creating corrective occlusion in permanent teeth is one of the most important objectives of pediatric dentistry. In other countries, a vast number of researches have been accomplished on the details of occlusion in deciduous teeth. But, unfortunately, there is still no accurate information about this in IRAN.

Purpose: The aim of this study was to evaluate the occlusion and interdental spaces of kindergarten children of Tehran.

Materials and Methods: On this basis, some information were gathered by means of a cross-sectional, descriptive, analytic study on 248 children during their 4-5 years of age. All kinds of deciduous molar and canine occlusion were studied and registered. Anterior and posterior interdental spaces by means of a gauge with an accuracy of 0.05 mm were also measured. Collected data was analyzed by t-student and variance analysis.

Results: In most children, the facial feature was mesocephalic and the profile was convex. The incidence of occlusion was Fluch Terminal Plane (FTP), Distal Step (DS) and Mesial Step (MS), respectively. There was a statistical significant relationship between the FTP, DS and MS molar occlusion and the occlusion of Class I, II and III canine ($P<0.05$). The prevalence of maxillary and mandibular primate spaces were 95% and 90% respectively, without significant difference between the two sexes. The anterior and posterior interdental spaces in maxilla were more than in mandible without significant difference in two sexes. There wasn't also a significant difference between the occlusion of deciduous molars and mandibular anterior dental spaces, maxillary and mandibular posterior dental spaces and the maxillary and mandibular primate spaces.

Conclusion: Meanwhile, there was a significant difference between the occlusion of deciduous molars and the maxillary anterior dental spaces ($P<0.05$). The maxillary anterior interdental space was less the others in bilateral distal step occlusion.

Key words: Deciduous teeth - Occlusion primate space- Interdental space

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Different Forms of normal occlusion in deciduous teeth has been described by many authors, but, it seems that it has some variations in different population and races.

Normal occlusion in deciduous teeth has the following characteristics:⁽¹⁻⁴⁾

- 1- Spacing between anterior teeth.
- 2- Primate space
- 3- Low overjet & overbite.
- 4- Flush terminal plane relationship.
- 5- Vertical inclination for anterior teeth.
- 6- Ovoid form for tooth arch.

The position of primary teeth usually becomes constant in the age of 3 years old when their eruption has been completed and it will not change till eruption of first molar. The alteration of teeth arch is very slight between 3 to 4 years of old.

But, around 5 to 6 years of old, eruption force of first permanent molars alters the size of tooth arch.^(3,5)

If there is malocclusion in primary teeth, it also may be present in permanent.

Therefore, pedodontists must evaluate the occlusion of primary teeth carefully and in the case of existing a problem, they should treat it. The treatments are classified as preventive, interventive or corrective. A pedodontist must be familiar with primary normal occlusion and clearly differentiate normal and abnormal forms.

The aim of this study was to evaluate of the occlusion and interdental spaces of Tehran's kindergarten children.

Materials and Methods

This study was a descriptive cross sectional study among 4 to 5 years old children of Tehran's kindergartens in educational year of 1999-2000.

248 cases were selected from total of 332 and for all the cases the questionnaires were completed. The other cases excluded due to the presence of posterior interdental caries with defective marginal ridges, anterior interdental

caries or extracted teeth with any cause.

The sampling method was randomized stratified sampling. Instruments used for examination were a pencil, dental floss, gauge and tongue blade.

All the cases were examined in natural light. In extraoral examination the face shape evaluated from frontal and profile.

The face shape from frontal was divided to three forms:

- 1- Mesofacial
- 2- Dolico-facial
- 3- Brachio-facial⁽⁶⁾

In brachio-facial, face is short and broad and mandible is square shape. The tooth arch is wide and muscles has relaxe and hanging character. Inferior third of face is short and vertical dimension is decreased. In mesofacial, face shape is ovoid and tooth arch and muscles are normal. In dolico-facial, face is long and narrow, inferior third and vertical dimation of face are longer than normal.⁽⁶⁾

For determing face shape from profile plane, three points on the profile has been marked: 1-soft tissue nasion 2-soft tissue A point 3-soft tissue B point. The lines that connect these points make an angle which the profile could describe by it as straight, convex and concave.^(6,7)

For evaluation of occlusion in intraoral examination, child's head supported on a rigid material and jaws guided to centric occlusion relationship. Then, the occlusion type of primary canine and molar has recorded.

Different types of the occlusion of primary molar were divided to 3 forms as:

- 1-flush terminal plane
- 2-mesial step
- 3-distal step.^(7,8,9)

Primary canine occlusion also divided to three classes 1-CI I 2-CI II 3-CI III^(8,10)

In class I: maxillary primary canine cusp tip locates in embrasure between lower canine and lower mandibular first molar.

In class II: upper canine cusp tip locates in embrasure between lower canine and lower

lateral.

In class III: upper canine cusp tip locates distal to embrasure between lower canine and lower first molar.

Finally, interdental spaces measured by car platine guage regulator with 0.05 mm accuracy which was disinfected for each child. At first, one of the blades selected randomly and seated in interdental space, if there was space remained between two teeth, another gouge (blade) added to first one until the interdental space was became completely filled with blades without any pressure on teeth or blades. If the blade was larger than interdental space and needs pressure for sitting between teeth, another smaller one was selected.

Presence or absence of interdental space between posterior teeth was checked with dental floss. Finally overjet and overbite measured in CO relationship.

Overbite was measured by millimetre or the percentage of lower incisor labial surface overlapping.^(1,7,10-12)

In this study overbite measured in millimetre. Finally, collected data analyzed by t student and analysis of variance.

Results:

The relationship between the occlusion of primary molars with face profile has been shown in table I. In all three forms of occlusion, convex profile occurred more than cuncave and straight.

Anterior interdental space of upper and lower jaw was observed in 93% and 85/5% of cases, respectively.

Primate space in upper and lower jaw was observed in 90% and 95% respectively. There was no statistical significant difference between primate spaces in both sexes (males and females) (Table III).

Anterior interdental space of upper and lower jaw was observed in 93% and 85/5% of cases respectively. In spite of this, there was a significant relationship between interdental

space in lower and upper jaw with primate space in them ($P>0.05$). Also, space of upper jaw was related significantly to anterior interdental space of lower jaw ($P<0.05$). There was a significant relationship between posterior interdental space of upper and lower jaws with upper and lower primate space ($P<0.05$) (t-test).

No significant difference was found between primary molars occlusion with upper and lower primate space, upper and lower posterior interdental space and lower anterior interdental space.

A significant relationship between occlusion of primary molars and upper anterior interdental space has seen ($P<0.05$). In DS cases, upper anterior interdental space was lower than FTP and MS cases (Table IV) (variance analysis).

No statistical significant relationship was observed between cross panel face shape and average of lower and upper posterior interdental space (Table V).

There was also no significant difference in overbite and overjet dimension between males and females. The average of overbite in 248 children was about 1.62 mm and average of overjet in this group was about 1.57mm.

Discussion

Human's face gradually alter by the effect of growth. Face profile is an important part of outer lateral appearance of face and approximately reflects skeletal form from lateral view. In 3 to 6 years of age, as a result of uncompleted differential growth of face, the profile usually is slightly convex.⁽⁷⁾ In a study child profile in primary teeth period, was more convex in both sexes.⁽¹³⁾

Presence of interdental space is a normal finding in primary teeth and normal occlusion is usually defined with this character.^(4,9,13-16)

In this study, has been observed that primate space in lower jaw was less than upper jaw. This result was similar to result of studies on Nigerian, English, Jewdish, Indian and Chinese children.^(3,8,11,17,18)

Table I: Distribution of study group in relation to occlusion and profile in 4-5 years old children of Tehran's kindergartens in year 2000

Occlusion	Profile	Straight		Convex		Concave	
		No.	Percent	No.	Percent	No.	Percent
FTP (N=171)		45	26	122	71.5	4	2.5
MS (N=24)		8	33	13	54.5	3	12.5
DS (N=44)		5	11.5	39	88.5	0	0

Table II: Distribution of study group in relation to maxillary primate space and sex in 4-5 years old children of Tehran's kindergartens in year 2000

Maxillary primate space	Sex	Girl		Boy		Total	
		No.	Percent	No.	Percent	No.	Percent
(0)		6	5.6	6	4.3	12	4.8
(0.1-1.50)		47	43.5	52	37.1	99	39.9
(1.51)		55	50.9	82	58.6	127	55.2
Total		108	100	140	100	248	100
SD		0.99		1.07		1.05	

t-test $t=1.54$ $P=0.21$

Table III: Distribution of study group in relation to mandibular primate space and sex in 4-5 years old children of Tehran's kindergartens in year 2000

Mandibular primate space	Sex	Girl		Boy		Total	
		No.	Percent	No.	Percent	No.	Percent
(0)		10	9.3	15	10.7	25	10.1
(0.1-1.50)		71	65.7	87	62.1	158	63.7
(1.51 ⁺)		27	25	38	27.2	65	26.2
Total		108	100	140	100	248	100
Mean		1.05		1.12		1.09	
SD		70%		87%		81%	

t-test $t=0.67$ $P=0.50$

Table IV: Distribution of study group in relation to occlusion and maxillary anterior interdental space in 4-5 years old children of Tehran's kindergartens in year 2000

Maxillary anterior interdental space	Occlusion	0	0.1-2.99	3+	Total	mean	S.D
		FTP	10	92	69	171	2.59
MS	0	14	10	24	3.12	1.64	
DS	7	24	10	44	1.97	1.50	
Total	17	133	89	239	2.53	1.63	

F=4.33 $P=0.01$

Table V: Distribution of study group in relation to shape of the face and the mean of posterior interdental space (maxilla and mandible) in 4-5 years old children of Tehran's kindergartens in year 2000

Shape of the face	Posterior interdental space			Total	mean	S.D
	0	0.01-0.75	0.76+			
Brachiofacial	5	13	11	29	0.52	0.41
Dolichofacial	14	14	10	38	0.40	0.39
Mesofacial	69	80	32	181	0.35	0.34
Total	88	107	53	248	0.38	0.36

F=4.33 $P=0.01$

Relationship of primate space in upper jaw and lower jaw was in contrast with leeway space. Leeway space in lower jaw was more than upper jaw. One of the most important reasons for this is more mesial migration of permanent mandibular first molar for reaching to class I normal occlusion. Although larger primate space in maxilla and generally anterior positioning of this space in maxilla to mandible is the result of larger size of maxillary anterior teeth rather than mandibular anterior teeth. Primate space in upper jaw has been used for alignment of permanent anterior teeth.

In this study, primate space length didn't show significant difference between males and females. But Joshi et al⁽³⁾ has reported more primate space in males and maxilla rather than females and mandible.

It has been reported that larger primate space exists in mandible rather than maxilla.⁽¹⁹⁾

Otuyemi⁽⁸⁾ reported anterior physiologic space in both Jaws in 32% of cases of Nigerian 3-4 years old children.

The average of posterior interdental space was 0.26% millimeter in upper jaw and 0.12 millimeter in lower jaw.

Posterior interdental contact was seen in 38.3% of cases in upper jaw and 68.5% of cases in lower jaw. Instead, in Nigerian children these items were 87.2% and 86.7% for upper and lower jaws. This difference may be due to nutritional status and race.

In comparison of different face shape from frontal view and posterior interdental space, no significant difference has been seen. If there was a difference, it could be due to the effect of muscular forces of face on teeth and movement of posterior teeth and closure of posterior interdental spaces. It seems that perioral muscular forces are not enough to move the

teeth on alveola.

Crowding or absence of space in anterior maxilla has been observed in 24.2% of Causcasian children.⁽²⁰⁾ But in our study, the space was absent in 6.9% of cases. This parameter in lower jaw of Causcasia children and our study were seen in 54.1 and 14.5% cases, respectively. Therefore, space deficiency in anterior maxilla was much lower than anterior mandible.

Ravn⁽²¹⁾ reported that crowding or closed contact between all teeth of maxilla and mandible was in 5 and 3.5% of cases.

A significant relation was seen between anterior interdental space of maxilla and mandible and posterior space of maxilla and mandible with primate space. It shows that presence of interdental space in both jaws could have a logic relation and by the observation of space in anterior maxillary teeth, it could be expected in mandible.

In this study, no significant relation was observed between occlusion types of primary molars with upper and lower primate spaces and posterior interdental space. Therefore, it seems that occlusion type of primary molars and interdental space are two completely separate entities. The lower average of upper anterior interdental space in DS group may be due to anterior positioning of upper jaw and higher perioral muscular forces which act on anterior upper teeth.

A longitudinal research should be done to evaluate relationship between occlusion types of primary molars and interdental space from the time of primary teeth eruption and reaching final occlusion to the time of first permanent molar eruption and mixed dentition period. So, the confounding factors can diminish and the results will become more reliable.

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