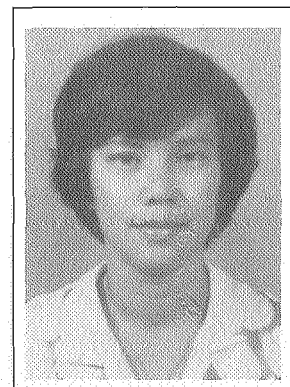


Primary dentition occlusion in Chinese, Indian and Malay groups in Malaysia

Kok Chin Woon B.D.S.(Sing), M.S.D.(U.Wash), Cert Ortho.(U.Wash)
Kuala Lumpur, Malaysia



Abstract: A survey of the primary occlusion in the three ethnic groups, Chinese, Indians and Malays was carried out in Malaysian preschool children between the ages of 3 to 6 years. The main criteria used in the selection of sample was the presence of only the primary dentition. A wide combination of different types of spacing was found. Approximately one third of the cases had incisor spacing and primate spacing in both arches. The occurrence of spacing mesial and distal to canines was just as common as the primate spacing. Chinese and Malay had almost similar distribution of different types of occlusion, whilst the Indians had a higher incidence of Class II malocclusion. An average of 2.4% of the sample had posterior crossbite. Rotation of the incisors formed an average of 17.79% of the cases, with significantly more rotation of the lower arch. The most common rotated teeth were the bilateral mesiolabial rotation of the lower central incisors. Where the rotation of the unilateral lateral incisor was present it was in the distolabial direction.

Reference: Aust.Orthod.J. 10(3): 183 - 185 (1988)

MeSH words: Dental occlusion; dentition; tooth, deciduous

Key words: Occlusion, primary dentition, Chinese, Indians, Malays, Malaysia

INTRODUCTION

Studies of the occlusion of the primary dentition have been carried out in various parts of the world. However there has not been a study on occlusion of the primary dentition in Malaysia. The aim of this study was to obtain information on the occlusion of the primary dentition among preschool children in Malaysia. In addition, due to the ethnic composition of Malaysia, the occlusion of the children among the three main races Chinese, Indians and Malays will be compared.

MATERIALS AND METHOD

The sample consisted of 426 preschool children selected from a survey of 812 preschool children, aged 3-6 years from 8 randomly selected nursery schools. All the children selected were in the primary dentition stage without the presence of any permanent teeth. They were from three main ethnic groups, Chinese, Indians and Malays. Each child was examined by one examiner and the assessment was recorded in a standard form. The following features of occlusion were recorded:

1. **Rotation:** This was recorded as present when the angle of rotation exceeded 30 degrees from normal. It was recorded as either a mesiolabial or a distolabial rotation.
2. **Tipping:** This was recorded as present when the angle of tipping in relation to the long axis exceeded 30 degrees.
3. **Displacement:** Buccal or lingual displacement in the same direction where there is a break in contact point.
4. The maxillary and mandibular arches were then assessed for *crowding*, generalised spacing and primate spacing. The arches were divided into buccal segments i.e. canines and molars, and incisor segment: (a) spacing — a lack of contact between adjacent teeth. (b) crowding — a lack of space for the teeth concerned.
5. **Second primary molar relationship:** (a) Class I: The mesiobuccal cusp occluding with the mesiobuccal groove of the lower. (b) Class II: The mesiobuccal cusp occluding more than half a cusp anterior to the mesiobuccal groove. (c) Class III: The mesiobuccal cusp occluding more than half a cusp posterior to the mesiobuccal groove.
6. **Canine relationship:** (a) Class I: The tip of the upper primary canine in the same vertical plane as the distal

surface of the lower primary canine in centric occlusion.

(b) Class II: The tip of the upper primary canine in anterior relationship to the distal surface of the lower primary canine in centric occlusion. (c) Class III: The tip of the upper primary canine in posterior relationship to the distal surface of the lower primary canine in centric occlusion.

7. **Overjet:** (a) Ideal: A positive overjet not exceeding 3mm measured on the primary central incisor. (b) Edge-to-edge: Upper and lower primary central incisor in an edge-to-edge relationship in centric occlusion. (c) Reversed: The lower primary central incisor in anterior relationship to the upper primary central incisor in centric occlusion. (d) Increased: A positive incisor overjet of more than 3mm.

8. **Overbite:** Expressed as the vertical distance from the incisal edge of the maxillary central incisor to the incisal edge of the mandibular central incisor when the teeth are in centric occlusion. It was recorded as a percentage of overlap of the lower labial surface of the lower central incisor. Scores recorded were 0, 0-50%, 50-100% and over 100%.

9. **Anterior openbite:** The incisal tips of the lower primary incisor lie below the level of the incisal tips of the upper primary incisors in centric occlusion.

10. **Lateral openbite:** The cusps of the lower molars below the level of the cusp tips of the upper molars.

11. **Posterior crossbite:** The upper molars occluding in lingual relationship to the lower primary molars in centric occlusion.

Statistical Analysis

The student's 't' test for determining the statistical significance of a difference between the two samples were used. The level of significance used was at the 0.05 level.

RESULTS

The distribution of the sample according to race, Chinese, Indians and Malays is as shown in Table 1.

Table 1. Distribution of the sample according to race and sex

Race	Chinese		Malays		Indian	
Sex	Male	Female	Male	Female	Male	Female
Number	147	122	63	52	21	21
Total	269		115		42	

This population group reflects the population in the urban area where the survey of the preschool children was conducted. The age of the children ranged from 3 years 2 months to 6 years 5 months.

Results of the various features of occlusion are as shown in tabulated form in *Table 2* and *Table 3*. The

Table 2. Crowding, spacing and rotation of teeth in Chinese, Malays and Indians (in percentage)

Characteristics	Chinese	Malays	Indians
Incisor crowding			
upper arch	7.28	3.67	0
lower arch	11.49	9.17	13.50
both arches	3.83	1.83	5.40
Incisor spacing			
upper arch	8.43	12.84	18.42
lower arch	29.50	26.61	13.16
both arches	26.82	33.94	39.47
Primate spacing			
all quadrants	34.11	25.23	29.27
upper only			
bilat.	39.22	56.76	51.22
(unilat.	7.45	6.31	0
lower only			
bilat.	4.31	0	2.44
unilat.	8.23	0.90	4.88
Post-canine spacing			
upper bilat.	50	26.96	40.48
unilat.	4.96	7.83	3.38
Rotation of teeth			
upper	3.02	1.83	2.63
lower	15.09	11.30	19.51

Table 3. Characteristics of occlusion in Chinese, Malays and Indians (in percentage)

Characteristics	Chinese	Malays	Indians
Molar occlusion			
Class I	79.53	79.28	61.90
Class II	7.09	7.21	19.05
Class III	1.57	6.31	0
Unilat. I & II	10.62	7.21	19.04
Unilat. I & III	1.18	0	0
Canine Relationship			
Class I	78.73	72.81	62.79
Class II	10.82	11.40	25.58
Class III	0	1.75	0
Unilat. I & II	9.33	14.04	11.63
Unilat. I & III	1.12	0	0
Overjet			
Ideal	57.20	51.40	39.47
Increased	36.74	44.86	60.53
Edge to edge	2.65	1.87	0
Reversed	3.41	1.87	0
Overbite			
0	5.77	4.67	0
0-50	55.0	66.36	61.54
50-100	26.54	23.36	28.21
over 100	7.31	4.67	7.69
Openbite	5.38	0.93	2.56
Crossbite	2.92	1.80	2.40

results for sex were pooled for each race as there was no significant difference between the male and the female sample in each racial group.

Rotation, Tipping and Displacement

The frequency of rotation of teeth in the sample is shown in *Table 2*. Statistical analysis using 't' test showed that there was significantly more rotation of teeth in the lower arch as compared to the upper arch. The most frequently rotated teeth were bilateral lower central incisors which were rotated distolabially. Rotation of the lower central incisor in the distolabial direction was next frequent. It was interesting to note that rotation of the lower lateral incisor if it occurred was unilateral and mesiolabial.

Tipping and displacement occurred rarely and was only found in 2 cases each, both being in the Chinese sample. There was no significant difference among the

racies in the prevalence of rotation of teeth.

Crowding

Crowding was only present in the incisor region. There was no significant difference in the number of the sample with crowding between the upper and lower arches in the Chinese and Malays. However, the Indian sample had significantly more crowding in the lower incisors. It was also found that, in the Chinese and Malay groups, there was significantly more crowding in the individual arches and less crowding was present in both arches in the same child. There was no significant difference in the number of the sample with crowding among the three races.

Primate Spacing: *Table 3* showed that approximately 90% of the sample had some combination of primate spacing, 29.54% having primate spacing in all quadrants. There was no significant difference among the races where presence of primate spacing in all quadrant was concerned. There was significantly more primate spacing in the upper arch compared to all quadrants and the lower arch. It was also interesting to note that in addition to primate spacing, spacing distal to canines were just as common.

Occlusion:

From the *Table 3* on occlusion, Indians had a higher incidence of Class II than the Chinese and Malays for canine and molar relationships. Malays had significantly more Class III molar relationships than Chinese and Indians.

Indians had significantly more increased overjet than Chinese but not so when compared to Malays. However Chinese and Malays had more Class III malocclusions than Indians but there was no significant difference between Chinese and Malays. Indians had less edge-to-edge bite as compared to Chinese and Malays. Chinese had a much higher incidence of openbite (5.38%) compared to the Indians (2.56%) and Malays (0.93%). Only one case of lateral openbite was present in the Chinese. Crossbite formed an average of 2.4% in the sample.

DISCUSSION

The main criterion used for selecting the sample from 3 ethnic groups, Chinese, Indians and Malays, in this study was the presence of only the primary dentition. In most previous studies, Stallard (1932), Taylor (1935), Foster and Hamilton (1969) and Korkhaus (1982), the samples were Caucasians in the age groups between 3 to 6 years during which some permanent dentition may have erupted. Hence in the comparison of studies on occlusion, conclusions can only be inferred due to the different criteria used in sampling and in examination.

Spacing

Presence of spacing between incisors and 'anthropoid' spaces or primate spaces are commonly described as features of normal occlusion (Baume 1950, Houston 1983, Foster 1982). This study also confirmed Foster and Hamilton's findings on the presence of wide variation in the pattern of spacing of the teeth and every possible combination of spacing was found. Approximately one third of the cases examined in this study had incisor spacing in both upper and lower arches and approximately another one third had spacing in either the upper or lower arch only. Foster and Hamilton (1969) also found 33% had spaces between all the incisors in upper and lower arches. There were some differences in the distribution pattern of incisor spacing among the three races, Chinese and Malays having significantly more spacing in the lower jaw as compared to the upper. Differences in the other areas were not significant. Crowding was less frequent.

A wide variety of combination of primate spacing was found. It was interesting to note that the occurrence of spacing on both sides of the canines were as common as the primate spacing. Similar findings by Foster and

Hamilton (1969) would suggest that a common feature of primary occlusion should be the presence of spaces both mesial and distal to the canines rather than primate spaces alone.

Occlusion

Studies by Korkhaus (1982), Stallard (1932) and Taylor (1935) on 5 to 6 year old children showed an average of 77% Class I, 17% Class II and 6% Class III. In this study, assuming that the unilateral Class I and Class II and unilateral Class I and Class III molar combinations belonged to the Class II and Class III respectively (*Table 3*), the distribution of occlusion in Chinese and Malays in the 3 classes were quite similar. However the Indians had less Class I (62%), more Class II (38%) and no Class III in this sample. Canine and molar relationships, overjet and overbite indicated that the Indian sample had more Class II whilst the Chinese and Malay samples were more Class III. A previous study by Woon (1983) using cephalometric lateral skull radiographs also showed more Class II relationships among Indians as compared to the other two races.

The prevalence of distolabial rotation of the lower central incisor bilaterally, and the mesiolabial unilateral rotation of the lateral incisor, is an interesting finding. The significantly greater incidence of rotation of the lower incisors is probably due to the effect of more crowding observed in the lower arch. But the presence of rotated teeth in the uncrowded arch would suggest that the rotations are developmental in origin.

REFERENCES

- BAUME, L.J. (1950)
Physiologic tooth migration and its significance for the development of occlusion. I. The biogenetic course of the deciduous dentition.
J.Dent.Res. 29:123-132
- FOSTER, T.D. (1982)
A textbook of orthodontics
2nd Ed. Blackwell Scientific Publications
- FOSTER, T.D. and HAMILTON, M.C. (1969)
Occlusion in the primary dentition
Brit.Dent.J. 126:76-79
- HOUSTON, W.J.B. (1983)
Walter's orthodontic notes
4th ed. Wright PSG Bristol London Boston
- KORKHAUS, G. (1982)
The frequency of orthodontic anomalies at various ages
Int.J. of Orthodontia 14:120-135
- STALLARD, H. (1932)
The general prevalence of gross symptoms of malocclusion
Dental Cosmos 74:29-37
- TAYLOR, A.T. (1935)
A study of the incidence and manifestations of malocclusion and irregularity of the teeth
Dental J. of Australia 7:650-657
- WOON, K.C. (1983)
The distribution of malocclusions in Malaysians
Dent.J.U.Malaya 1:31-35

Correspondence to:

Dr K.C.Woon
Department of Children's Dentistry
Faculty of Dentistry
University of Malaya
KUALA LUMPUR 47400
Malaysia