

# The Primary Canine – Molar Occlusal Relationship in 5 to 6 Years Old Boys in Rass City, Qassim Region of Saudi Arabia

Zeyad Alsughier\*

Department of Orthodontics and Pediatric dentistry, Pediatric Dentistry Division, College of Dentistry,  
Qassim University, Almulida, Qassim, Kingdom of Saudi Arabia

\*Corresponding author: [dr.zeyad.alsughier@qudent.org](mailto:dr.zeyad.alsughier@qudent.org)

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**Abstract Aim:** To assess primary canine and molar occlusion in children 5 to 6 years of age in Rass city, Qassim region of Saudi Arabia. **Materials and Methods:** The study followed a cross-sectional design to include 296 Saudi boys aged 5 to 6 years in Rass city, Qassim region of Saudi Arabia. The sample was selected randomly from Primary schools utilizing a stratified cluster sampling approach. Each participant was assessed for an occlusal relationship for primary molars using the criteria of Baume and for primary canines using the criteria of Foster & Hamilton. The correlation between primary canine and molar relationship was assessed using chi-square test and  $p < 0.05$  was adopted as statistically significant. **Results:** A total of 296 male children were examined. About 57.4% had flush terminal plane, 36.8% mesial step and 5.7% distal step relationship. Class I canine relationship was observed in 80.7 % of cases while 7.77% and 12.16% of children had class II and class III relationship respectively. Flush terminal plane relationship coincided with class I canine in 67.5% of the children examined. Mesial step was associated with class III canine relationship in 83.3% and distal step with class II canine relationship in 47.8% of the cases. The relationship between molar and canine tooth occlusion in primary dentition was highly significant at  $p < 0.001$ . **Conclusion:** A flush terminal plane relationship in primary molars and class I relationship in primary canines were the most common among 5 to 6 years old Saudi boys.

**Keywords:** canine, children, cross sectional, molar, occlusal relationship, primary dentition

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Hence this study was intended to assess primary canine and molar occlusion in children 5 to 6 years of age in Rass city, Qassim region of Saudi Arabia.

## 1. Introduction

The key to successful management of children in dentistry is to differentiate between normal and abnormal conditions. Since the occlusion in primary dentition has a significant impact on the establishment of occlusion in permanent dentition [1], it is important to record primary occlusal characteristics accurately. The primary occlusion has been studied in different parts of the world with varying results for different age and ethnic groups. Yilmaz et al. [2] reported a flush terminal plane molar and class I canine relation among Turkish children. In a study done by Anderson et al. [3] involving African American children, the mesial step was found the most common molar occlusion. In another study carried by Sahebalam et al. [4], a significant relation between the primary molar flush terminal plane and class II canine occlusion was observed. Studies done by Farsi and Salama [5] and Baidas [6] in Saudi Arabia showed that flush terminal plane for primary molars and class I canine occlusion were the highest.

The amount of literature available regarding the canine and molar relationships in the primary dentition is limited.

## 2. Materials and Methods

The target population in the current study comprised Saudi boys aged 5 to 6 years from Rass city, Qassim region of Saudi Arabia. The sample was selected randomly from Primary schools utilizing a stratified cluster sampling. All necessary permissions were obtained. Informed parental consent was taken through a letter explaining the study and the students with positive consent were included in the student. The approval for the study was obtained from the ethical committee of College of Dentistry, Qassim University. A cluster random sample of Sixteen schools was selected from a total of 47 primary schools in Rass city.

### 2.1. Inclusion Criteria

1. Healthy Saudi Male school children aged 5 to 6 years with unerupted permanent first molars.

2. All deciduous teeth should be present.

## 2.2. Exclusion Criteria

1. Children with one or more 1st permanent molars erupted.
2. Children suffering from systemic disease, physical or mental abnormality or any developmental defects.
3. Children with extensive dental caries.

The selected schools had a total of 411 children meeting the eligibility criteria. Out of these, 97 children having erupted first molars and/or extensively carious teeth, and 18 without parental consent were excluded.

The age of the child was calculated based on the date of birth documented in school records. Examinations were performed by one examiner who is a pediatric dentistry specialist in College of Dentistry, Qassim University. Calibration was carried out before the main study by examining a preselected group of 25 children twice in a time interval of 2 days. The Kappa score of 0.9 was obtained for Intra-examiner. Examinations were carried out using a LED headlamp as a light source, dental mirror and tongue depressors. No dental radiography, impressions, photographs or skeletal assessments were performed.

Occlusal assessments were recorded with the maxillary and mandibular teeth in centric occlusion in children having a full set of deciduous teeth. Both sides of the dental arch were assessed for molar and canine relationship. The relationship was considered flush terminal in cases where there was flush terminal on one side and mesial or distal step on the opposite side. Similarly, the canine relationship was recorded as class I where class I relation was noticed on one side and class II or class III on opposite side.

The deciduous molar relationship was classified based on the criteria of Baume [7] (1950):

- A. Flush terminal plane: The distal surface of upper and lower second deciduous molars are in the same vertical plane.
- B. Mesial Step: The distal surface of the lower second deciduous molar is located anterior to the distal surface of the upper second deciduous molar.
- C. Distal step: The distal surface of the lower second deciduous molar is lying posterior to the distal surface of the upper second deciduous molar.

The deciduous canine relationship was determined based on the criteria of Foster & Hamilton [8] (1969):

- A. Class I: The tip of the upper deciduous canine is in the same vertical plane with the distal surface of the lower deciduous canine.
- B. Class II: The tip of the upper deciduous canine is anterior to the distal surface of the lower deciduous canine.

- C. Class III: The tip of the upper deciduous canine is posterior to the distal surface of lower deciduous canine.

Data were analyzed using SPSS Version 20. Intra-examiner agreement was assessed by using Cohen's Kappa statistics. The correlation between primary canine and molar relationship was assessed using chi-square test and  $p < 0.05$  was adopted as statistically significant.

## 3. Results

The prevalence of molar and canine relationship has been presented in Table 1 and Table 2 respectively. The Flush terminal plane relationship was the most common (57.4%) relationship observed in the study population. About 36.8% of children had mesial step relationship, while the distal step was only found in 5.7% of the children.

**Table 1. Prevalence of molar occlusal relationship in primary dentition**

		No	%
Molar N= 296	Flush	170	57.4%
	Mesial	109	36.8%
	Distal	17	5.7%

**Table 2. Prevalence of canine relationship in primary dentition**

		No	%
Canine N= 296	Class I	237	80.07%
	Class II	23	7.77%
	Class III	36	12.16%

Regarding canine relationship, class I relationship was detected in 80.07% of cases while 7.77 % and 12.16 % of cases had class II and class III relationships respectively. Table 3 gives a comparison of the molar and canine relationship in the primary dentition. The flush terminal plane relation was observed to be associated with Class I canine relationship in 67.5%, with class II canine relationship in 30.4% and with class III canine relationship in 8.3% of cases. The mesial step relationship in primary molars was associated with class III canine relation in 83.3%, with class I in 31.2% and with class II in 21.7% of the cases. On the other hand, the distal step molar relationship occurred concomitantly with class II, class III and class I canine relation in 47.8%, 8.3% and 1.3% of children respectively. The relationship between molar and canine tooth occlusion in primary dentition was highly significant at  $p < 0.001$ .

**Table 3. Comparison of the molar and canine relationship in primary dentition**

		Class I (N1= 237)		Class II (N2=23)		Class III (N3= 36)		P
		No	%	No	%	No	%	
Primary Molars	Flush	160	67.5%	7	30.4%	3	8.3%	P<0.001
	Mesial	74	31.2%	5	21.7%	30	83.3%	
	Distal	3	1.3%	11	47.8%	3	8.3%	

p: for chi-square test

\*Significant at  $p < 0.05$ .

## 4. Discussion

It has been shown that the discrepancies in primary dentition are of vital importance in determining the future occlusion of permanent teeth [9]. The most common occlusal relationships studied have been flush terminal plane, mesial step and the distal step. A study conducted by Farsi and Salama [5] in Saudi Arabia involving 3-5-year-old children reported that 80% of children included in the study were having flush terminal plane relationship followed by mesial step 11.9%, and distal step 8.1%. Another Saudi study by Baidas [6] on children aged 3-5 years came up with the corresponding percentages as 75%, 13.9% and 11.1%. The present study exhibited comparatively lower value of flush terminal plane (57.4%) and distal step (5.7%) than those reported in the former two studies. However, it revealed a higher value (36.8%) of mesial step type of relationship. The different results may be attributed to age differences among children included in the three studies. The relatively higher percentage of mesial step in the 5-6 years old children in the present study may be because of mandibular growth in anterior direction and first permanent molar eruption force. On the other hand, studies carried out by Zakirulla [10] on 2-6 years old children in Saudi Arabia, by Khan et al. [11] on 3-6 years old children in North India and by Bhayya et al. [1] on 4-6-year age group Indian children produced figures almost comparable to those of the study under discussion.

In contrast to the present study, studies by Anderson et al. [3] involving African American children, Bishara et al. [12] on northwestern European children and Abu Alhajja and Qudeimat [13] on Jordanian children found mesial step relationship to be the most common primary molar relationship.

Bishara et al. [12] inferred that the distal step relationship in primary dentition almost always developed into a class II molar occlusion in permanent dentition, so early orthodontic intervention should be considered as these cases are not corrected by itself with advancing age. They also observed that when primary dentition with a flush plane occlusion, it develops into a class I molar occlusion in 56% of cases and class II molar occlusion in 44% of cases in permanent dentition. Therefore, flush terminal plane cases should remain under periodic observation to begin early orthodontic treatment if necessary. They concluded that mesial step occlusion in primary dentition would result most probably in class I molar occlusion in permanent dentition, to a lesser degree would lead to class II molar occlusion and the occurrence of class III molar relationship rises as the amount of mesial step rises. In addition, Hegde et al. [14] reported that permanent molar relationship can be best predicted by the initial primary molar relationship. With increase in age, children exhibiting distal step molar relation decrease and mesial step molar relation increases allowing us to predict the permanent molar relationship more accurately. In the present study, the higher prevalence of flush terminal and mesial step primary molar relationship may be a positive contributory factor in developing class I molar relation in permanent dentition.

In this study, primary canine relationship was class I in 80.07%, class II in 7.77% of children and class III in

12.16% of children. The class I canine relationship has also been recorded as the most common relationship in a number of other ethnic groups [1,2,5,6,11,13,15]. The percentage of class II canine relationship in the present study is less than that found in children from England [8] (45%), Denmark [16] (31.6%), Jordan [13] (29%) and Iran (49.1%). However, class III canine relationship compared to class II was found to be more common. This finding is in agreement with those of studies conducted by Yilmaz et al. [2] in Turkish children and Baidas [6] in Saudi children. The decreased prevalence of class II canine relationship found in the present study may be explained by the hypothesis put forward by Farsi and Salama [5] that at the age of 5-6 year the termination of sucking habit may diminish the prevalence of class II canine relationship at least in some cases.

In the study under discussion, flush terminal molar relationship in primary dentition was accompanied by class I canine occlusion in 67.5%, mesial step presented with class III canine occlusion in 83.3% and distal step was associated with class III occlusion in 47.8%. These observations are contrary to Sahebalam et al. [4] who reported that flush terminal is common with class II canine relationship in 62.3%, mesial step with class I canine relationship in 61.2% and distal step with class III canine relationship in 25.7% of the cases.

The current study has only investigated male children whom were in the age group from 5 to 6 years. Therefore, longitudinal studies with a more representative sample are required to assess the occlusal relationship changes during passage from deciduous to mixed dentition.

## 5. Conclusion

The present study revealed that a flush terminal plane relationship in primary molars and class I relationship in primary canines were the most common among 5 to 6 years old Saudi boys. Also, a significant association found between the primary molar flush terminal plane and class I primary canine relationship.

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