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Original Research Article

Analysis of occlusion and its correlation with gender in primary and mixed dentition of pre-school and school children of Hazaribag city – A pilot study

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ABSTRACT

Background: The purpose of this pilot study was to analyse the prevalence of occlusion in primary and mixed dentition and correlate it with gender among pre-school and school children of Hazaribag city of Jharkhand.

Materials and Methods: A total of 408 children participated in the study. Out of which, 202 children of 3-5 years age and 206 children of 7-11 years were selected from schools in Hazaribag city of Jharkhand., India, and their occlusion was recorded based on the terminal planes. Data were statistically analysed applying Chi-square test using SPSS software.

Results: The most prevalent occlusion seen in the present study for Primary Dentition was Mesial Step plane (69.3%) followed by Flush Terminal plane (28.7%) and Distal Step (2%) respectively and the results were statistically significant. A significant correlation was also noted with gender. Males showed more Mesial Step plane (72.6%) than females (65.6%) and order of occurrence of occlusion was same in both the sexes. The most prevalent occlusion seen in the present study for Mixed Dentition was Class I (94.7%) followed by Class II (4.4%) and Class III (0.9%) respectively and the results were statistically significant. A non-significant correlation was also noted with gender. Males showed slightly more Class I (94.8%) than females (94.5%) and order of occurrence of occlusion was same in both the sexes.

Conclusion: The Mesial Step plane is significantly more prevalent in preschool children and Class I occlusion is significantly more prevalent in school children of Hazaribagh.

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1. Introduction

Pediatric orthodontics encompasses preventive and interceptive orthodontics. And, concepts and knowledge of developing occlusion in primary dentition is imperative to comprehend occlusion of the future permanent dentition. Therefore, establishment of a standard reference data on primary dentition occlusion and malocclusion seems invincible. The gold standard of classifying molar relationships in primary, mixed and permanent dentitions is as follows:[1–3]

1.1. Primary second molar relationship in primary dentition

Baume (1950) classified the primary molar relationship based on the distal surface of primary second molars.

1. Flush Terminal plane: The distal surface of maxillary and mandibular primary second molars lie in the similar vertical plane.

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2. Mesial step: The distal surface of mandibular primary second molar is mesial to the distal surface of maxillary primary second molar.
3. Distal step: The distal surface of the mandibular primary second molar is distal to the distal surface of maxillary primary second molar.

1.2. First permanent molar relationship in mixed and permanent dentition

Edward Angle (1899) classified the first permanent molar relationship as follows-

1. Class I molar relation: The mesiobuccal cusp of upper first permanent molar occludes with mesiobuccal groove of the lower first permanent molar.
2. Class II molar relation: The distobuccal cusp of upper first permanent molar occludes with the mesiobuccal groove of the lower first permanent molar
3. Class III molar relation: The lower first permanent molar lies mesial to upper first permanent molar by a premolar width or a cuspal width.

The understanding of the anteroposterior changes that occur in the transition of occlusion from primary to permanent dentition is vital for pediatric orthodontists and orthodontists performing early age interceptive orthodontics. There is a plethora of literature to prove that if any occlusal irregularities seen in deciduous dentition stage then corresponding permanent dentition shall imbibe similar disturbances or malocclusion. Previous studies have confirmed that occlusal characterstics are varied amongst different populations and ethnic groups, therefore, this study was attempted to overt occlusal features in children of Hazaribag.

2. Materials and Methods

2.1. Study area

This study was conducted in the private schools of Hazaribag city of Jharkhand.

2.2. Sample selection

This cross-sectional survey was based on clinical and photographic examination of the preschool children with primary dentition and school going children with mixed dentition. The sample was selected using census method where all participants fulfilling inclusion criteria were selected.

2.3. Inclusion and exclusion criteria

For preschool Children, participants with full set of primary dentition and without any partially/completely erupted permanent teeth were selected for the study and for school going participants with mixed set of primary dentition and permanent dentition and with compulsory presence of first permanent molar. Children with severe caries, extensive restorations like crowns and developmental anomalies were excluded from the study.

2.4. Data collection

The children were examined in their respective schools by a well-trained, single examiner using type IV examination under good day light. Written consent was taken from parents of the children selected for the study. The study was discussed with the school Principal explaining all pros and cons and permission was obtained.

Prior to examination, all participants rinsed their mouth with water. After that, children were made to sit on a chair in a relaxed position and asked to bite in centric occlusion, and the occlusion was recorded.

The data collected were entered and statistical analysis was done using Chi-square tests with SPSS software. The level of significance was set at 0.05.

3. Results

Among the total 408 children, 203 males and 205 females were examined and assessed for prevalence of different types of primary and mixed dentition occlusion.

Table 1 show Sex-wise distribution with occlusion status in primary dentition. It can be elucidated that the most prevalent occlusion seen in the present study for Primary Dentition was Mesial Step plane (69.3%) followed by Flush Terminal plane (28.7%) and Distal Step (2%) respectively and the results were statistically significant. A significant correlation was also noted with gender. Males showed more Mesial Step plane (72.6%) than females (65.6%) and order of occurrence of occlusion was same in both the sexes.

Table 2 show Sex-wise distribution with occlusion status in primary dentition. It can be elucidated that the most prevalent occlusion seen in the present study for Mixed Dentition was Class I (94.7%) followed by Class II (4.4%) and Class III (0.9%) respectively and the results were statistically significant. A non-significant correlation was also noted with gender. Males showed slightly more Class I (94.8%) than females (94.5%) and order of occurrence of occlusion was same in both the sexes.

4. Discussion

4.1. Occlusion and its correlation with gender in primary dentition

In our study, majority of occlusion in population with primary dentition had Mesial Step plane (69.3%) followed by Flush Terminal plane (28.7%) and Distal Step (2%). The results are in accordance with reports of Dilip Kumar et al

Table 1: Sex-wise distribution with occlusion status in primary dentition

Occlusion	Female		Male		Total	
	No.	%	No.	%	No.	%
Distal step	0	0.0	4	3.8	4	2.0
Flush terminal	33	34.4	25	23.6	58	28.7
Mesial shift	63	65.6	77	72.6	140	69.3
Total	96	100.0	106	100.0	202	100.0
$X^2 = 6.02$, P = 0.049, S						

Table 2: Sex wise distribution with occlusion status in mixed dentition

Occlusion	Female		Male		Total	
	No.	%	No.	%	No.	%
Class 1	103	94.5	92	94.8	195	94.7
Class 2	5	4.6	4	4.1	9	4.4
Class 3	1	0.9	1	1.1	2	0.9
Total	109	100.0	97	100.0	206	100.0
$X^2 = 0.033$, P = 0.98, NS						

and Gençay et al. where mesial step occlusion was inferred as the most prevalent one. The results were unaligned with plethora of literature reported by Bhat et al., Anu V et al and Yilmaz et al. where Flush terminal plane was notified as most prevalent one.[4–8] A significant correlation was also noted with gender. Males showed more Mesial Step plane (72.6%) than females (65.6%) and a study by Bhayya DP et al reported similar inference.[9] On the other side, a study by Alexander S reported no gender association with occlusion.[10]

4.2. Occlusion and its correlation with gender in Mixed Dentition

In our study, majority of occlusion in population with mixed dentition had Class I (94.7%) followed by Class II (4.4%) and Class III (0.9%). A systematic review by Alhammadi et al, where 2977 studies were reviewed and 53 studies were included has also summarized that global distribution of class I occlusion is 74.7% in permanent dentition followed by Class II and Class III, whereas in Mixed dentition of African population, the prevalence of Class I was highest (92.47%) followed by class II (5.1%).[11] These findings were in line with our study. A non-significant correlation of permanent molar occlusion was noted with gender in mixed dentition which is in accordance with findings of Das UM et al.[12,13] However a study by N H El-Mangoury showed significant association of occlusal traits with gender.[14]

Bishara et al. studied the changes during transition from primary to permanent molar relationship and concluded that mesial step plane in primary dentition may develop more into Class I and less in Class II occlusion; if flush terminal plane in seen in primary dentition, then chances of occurrence of class I is 56%and class II is 44%. And distal step plane may lead to occurrence of class II molar occlusion.[15]

5. Conclusion

In preschool children of Hazaribag with primary dentition, the Mesial Step plane is prevalent followed by Flush Terminal and Distal Step respectively.

1. In preschool children of Hazaribag with primary dentition, the Mesial Step plane is more prevalent in both the genders, but males show more prevalence than females which shows positive correlation of occlusion with gender in primary dentition.
2. In school going children of Hazaribag with mixed dentition, the Class I Occlusion is prevalent followed by Class II and Class III respectively.
3. In school going children of Hazaribag with mixed dentition, the Class I Occlusion is more prevalent in both the genders, but males show slightly more prevalence than females which shows non-significant correlation of occlusion with gender in mixed dentition.

6. Limitations

The study is a pilot study with limited sample size and hence results cannot be extrapolated on larger size populations or regions. Therefore, main study with large sample is being conducted on same parameters in the same region.

7. Source of Funding

None.

8. Conflict of Interest

None.

References

1. Fernandes S, Patel D, Ranadheer E, Kalgudi J, Santokì J, Chaudhary S, et al. Occlusal Traits of Primary Dentition among Pre-School Children of Mehsana District, North Gujarat, India. *J Clin Diagn Re*. 2017;11(1):92–6.
2. Sharma K, Bihani T, Kumar V. Prevalence of Malocclusion in Primary Dentition in Southeast Part of Haryana, India: A Cross-sectional Study. *Int J Clin Pediatr Dent*. 2021;14(6):757–61.
3. Angle EH. Classification of malocclusion. *Dent Cosmos*. 1899;41(3):248–64.
4. Anu V, Pavani B, Pavani D. Distribution of School Children Based on the Type of Terminal Plane in Primary Dentition: A Study among 3- to 5-year-old Children in Chennai. *Int J Clin Pediatr Dent*. 2020;13(2):136–7.
5. Kumar D, Gurunathan D. Primary Canine and Molar Relationships in Centric Occlusion in 3 to 6-year-old Children: A Cross-sectional Survey. *Int J Clin Pediatr Dent*. 2019;12(3):201–4.
6. Bhat SS, Rao HA, Hegde KS. Characteristics of primary dentition occlusion in preschool children: an epidemiological study. *Int J Clin Pediatr Dent*. 2012;5(2):93–7.
7. Yilmaz Y, Gŗbz T, Şimşek S, Dalmiş A. Primary Canine and Molar Relationships in Centric Occlusion in Three to Six Year-Old Turkish Children: A Cross- Sectional Study. *J Contemp Dent Pract*. 2006;7(3):59–66.
8. Gençay K, Aktören O. Türk çocuklarında süt dişi kavislerinin morfolojik olarak incelenmesi. *Pedodonti Klinik/Araştırma*. 1995;2:41–5.
9. Bhayya DP, Shyagali TR. Gender influence on occlusal characteristics of primary dentition in 4- to 6-year-old children of Bagalkot City, India . *Oral Health Prev Dent*. 2011;9(1):17–27.
10. Alexander S, Prabhu NT. Profiles, occlusal plane relationships and spacing of teeth in the dentitions of 3 to 4 years old children. *J Clin Pediatr Dent*. 1998;22(4):329–34.
11. Alhammadi MS, Halboub E, Fayed MS, Labib A, El-Saaidi C. Global distribution of malocclusion traits: A systematic review. *Dental Press J Orthod*. 2018;23(6):40.e1–e10.
12. Das UM, Venkatsubramanian, Reddy D. Prevalence of Malocclusion Among School Children in Bangalore, India. *Int J Clin Pediatr Den*. 2008;1(1):10–2.
13. Trehan M, Chugh VK, Sharma S. Prevalence of malocclusion in Jaipur, India. *Int J Clin Pediatr Dent*. 2009;2(1):23–5.
14. El-Mangoury N, Mostafa YA. Epidemiologic panorama of dental occlusion. *Angle Orthod*. 1990;60(3):207–14.
15. Bishara SE, Hoppens BJ, Jakobsen JR, Kohout FJ. Changes in the molar relationship between the deciduous and permanent dentitions: a longitudinal study. *Am J Orthod Dentofacial Orthop*. 1988;93(1):19–82.

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