

Effect of Eruption of First Permanent Molar on the Caries Pattern of Primary Second Molars - Original Research

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1. Introduction

Human growth involves 2 sets of teeth, primary dentition and permanent dentition. The chronology and sequence of eruption of human primary and permanent teeth are important milestones during a child's development. Estimation of eruption schedule is a very valuable tool in child's dental health planning including diagnostic, preventive and therapeutic measures in pediatric dentistry and orthodontics.¹ Any deformity with the primary set of teeth impacts the growth and development of the permanent teeth. The Occlusion of primary teeth is said to be completed with the eruption of the primary second molar which in turn defines the arch length, thus, helping in predicting the occlusion in permanent dentition.

The World Health Organisation identifies dental caries as the most prevalent disease globally which approximately affects 60-90% of school children.¹ Dental caries is said to be a multifactorial disease.² The Primary second and permanent first molar are more prone to caries because of their morphological characteristics as anatomical features.³ Also, post-eruptive enamel maturation differ among different teeth, which determine their susceptibility to Caries.⁴

The Primary second molar shows a unique pattern of decay that starts from initiation to complete eruption of permanent first molar i.e around 4to 8 years. During this period, the risk factors are Increase in cariogenic flora& adherence sites.⁵Hence, this study was designed with an objective to observe the 'Caries occurrence and pattern in primary second molar with the eruption of permanent first molar between the ages of 4-8 years'.

2. Materials and Method

64 school kids were screened within 2 age groups ranging from 4-8 years. Group division was done on the basis of eruption of 1st permanent molars and it was kept as a homogenous group with children having same geographical, social and economic status.(Fig. 1)

Inclusion criteria:

- Children within age group of 4-8 years.
- Children with brushing frequency- once daily
- no systemic disease
- Children with age =>4 years &<=8

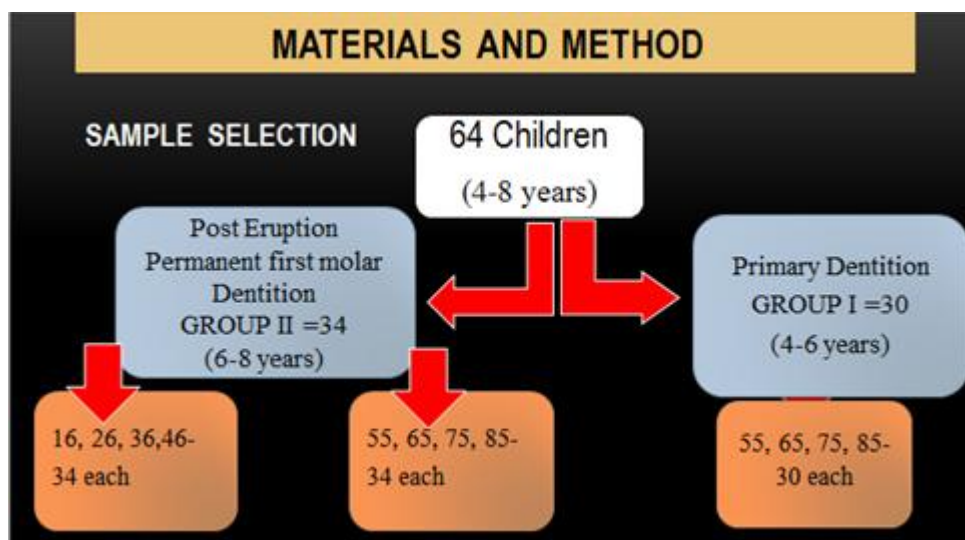


Figure 1: The division of participants into groups I and II and examined teeth

Methodology

- The participants were divided into 2 groups namely group I and II comprising of 30 and 34 participants, respectively.

- Group I comprised of participants with Primary Dentition and an age range of 4 to 6 years.

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- Group II comprised of participants in whom the eruption of Permanent First molar had completed and had an age range of 6 to 8 years.
- In Group I, second molars of the four quadrants were examined in all 30 participants.
- In Group II, primary second molars and permanent first molars of all the quadrants were examined in the 34 individuals.
- The intraoral examination was conducted on the basis of WHO 2013 pattern. A custom made record sheet was formulated and photographs of the teeth were recorded.

The surfaces examined were Occlusal/ Mesio-occlusal / Disto-occlusal /Mesio-Occluso Distal.

3. Results

The Mean Age of participants of Group I (Deciduous dentition) was 5.5 years and the Mean Age of Group II participants (Mixed dentition) was 7.5 years.

The total teeth examined in group I were 120 out of which 27 second deciduous molars were carious. (Fig 2 and 3)

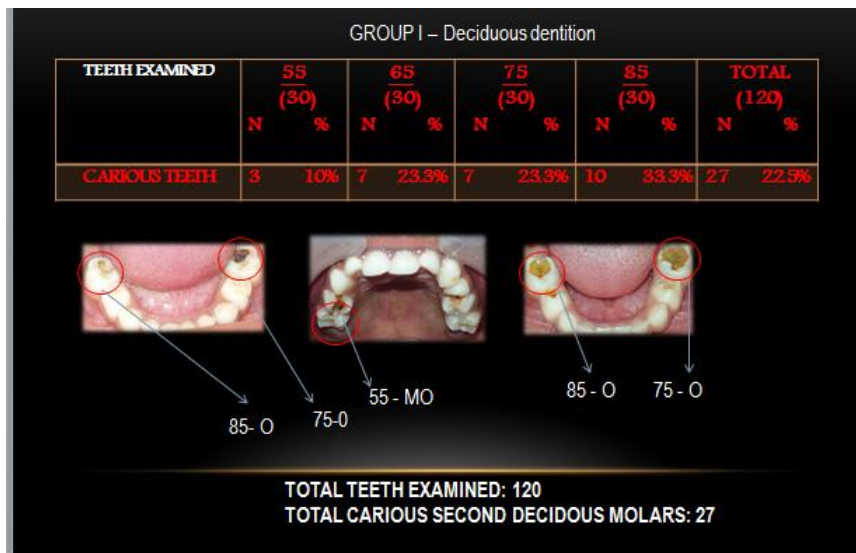


Figure 2: Details of Group I

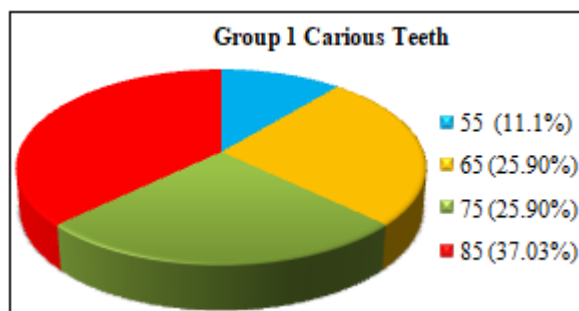


Figure 3: Distribution of Caries among all examined deciduous second molars of Group I.

The total teeth examined in group I were 136 out of which 55 second deciduous molars and 42 Permanent First molars were carious.(Fig 4)

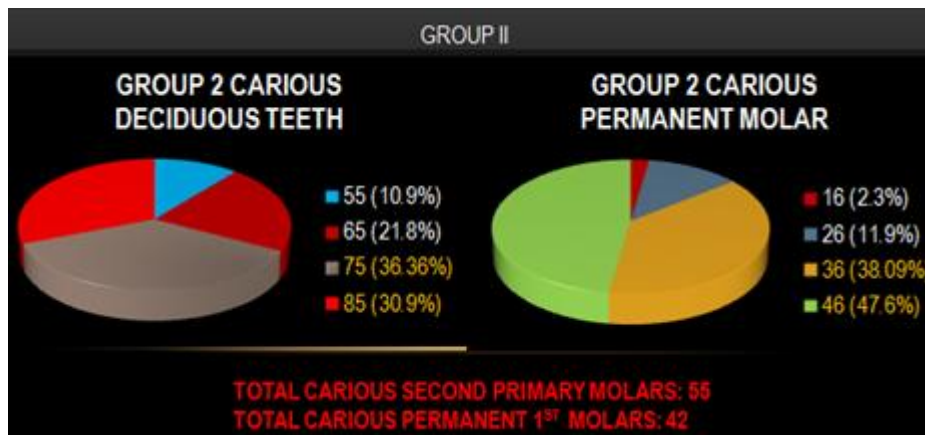


Figure 4: Distribution of Carious primary second molars and permanent first molars in Group II.

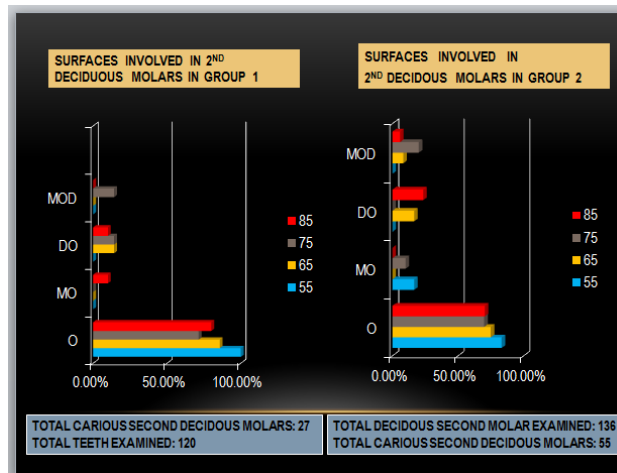


Figure 5: Surfaces involved in deciduous molars in Group I and II

The surfaces involved in the deciduous second molars of both groups were mostly occlusal followed by disto-occlusal. (Fig5)

Table 1: Percentage of teeth with distal caries in both groups

Primary teeth Cariou teeth	55	65	75	85	Total
Percentage of teeth with distal caries	0%	14%	28%	10%	14%
Mixed Dentition Cariou teeth	55	65	75	85	Total
Percentage of teeth with distal caries	0%	25%	29%	29%	21%

A total of 14% teeth exhibited distal caries in the primary dentition group and 21% teeth showed distal caries in the mixed dentition group, the difference however, was non-significant. (Table No.1 and Fig 6).

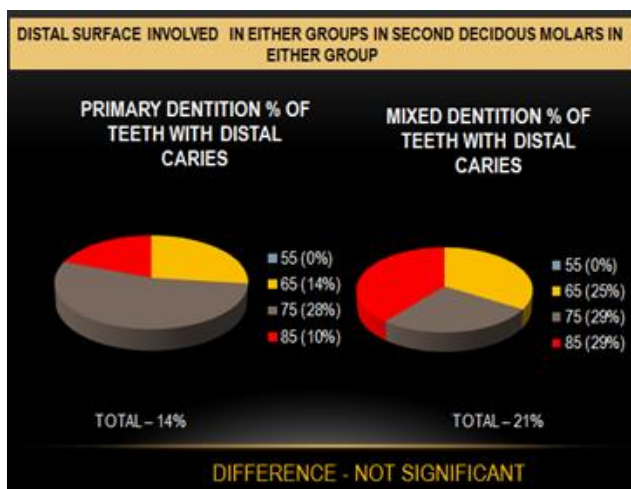


Figure 6: Difference between the distal surfaces involved in either groups in second deciduous molars in either group.

When the total percentage of teeth were assessed, it was observed that total percentage of caries in deciduous second molars in group I was 22.5%, while that of second molars in group II was 40.4%. The total percentage of caries in permanent first molar in the mixed dentition group (Group II) was 30.8% (Table 2)

Table 2: Total Percentage Of Caries In Second Deciduous Molars & Permanent 1ST Molars

Total Percentage of caries in second molars in GP I (Deciduous)	22.5%
Total Percentage of caries in second molars in GP II (Mixed dentition)	40.4%
Total Percentage of caries in Permanent 1st molars in GP II (Mixed dentition)	30.8%

Table 3: Percentage of Caries in Second Deciduous Molars & Permanent Molars in each quadrant in Either Groups

TOOTH	55	65	75	85	TOTAL
Percentage of Caries in GP I	10%	23.3%	23.3%	33.3%	22.5%
Percentage of Caries in GP II	17.6%	35.2%	58.8%	50%	40.4%
TOOTH	16	26	36	46	TOTAL
Percentage of Caries in GP II	2.9%	14.7%	47%	58.8%	30.8%

When the individual second molar in each quadrant and the permanent molars was assessed, the maxillary right deciduous second molar (55) had a caries percentage of 10% in Group I and 17.6% in Group II, while the permanent maxillary right first molar (16) had a caries percentage of 2.9% in Group II. The maxillary left deciduous second molar (65) had a caries percentage of 23.3% in Group I and 35.2% in Group II, while the permanent maxillary first molar (26) had a caries percentage of 14.7% in Group II. The mandibular left deciduous second molar (75) had a caries percentage of 23.3% in Group I and 58.8% in Group II, while the permanent mandibular left first molar (36) had a caries percentage of 47% in Group II. The mandibular right deciduous second molar (85) had a caries percentage of 33.3% in Group I and 50% in Group II. The permanent mandibular right first molar (46) had a caries percentage of 58.8%. The total percentage of caries in the second deciduous molars in Group I was 22.5% and in Group II it was 40.4%, while the total percentage of caries in Permanent first molars of Group II was 30.8%. (Table 3)

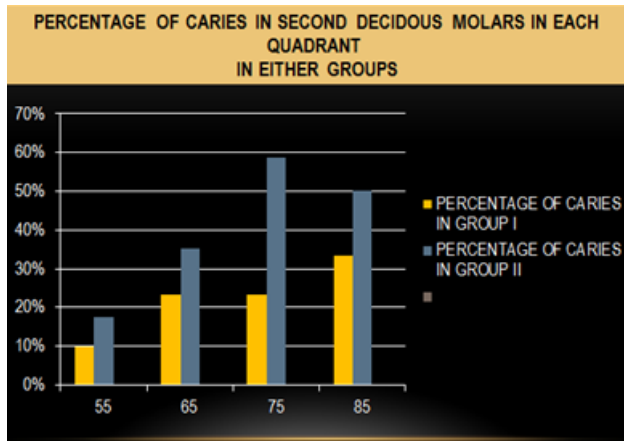


Figure 7: Percentage of caries in second deciduous molars in each quadrant in either groups

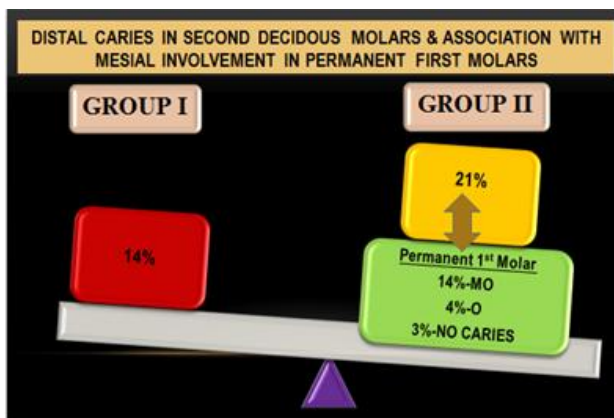


Figure 8: Distal caries were present in 21% of second deciduous molars in Group II

It was observed that there was a strong association between the carious involvement of the distal surface of deciduous second molars, in group I (14%) and group II (21%), and the carious involvement of the mesio-occlusal surface (14%) and the occlusal surface (4%) of the permanent first molar.

Statistical analysis

The statistical analysis was done using the Chi Square test and the values obtained were $\text{CHI-SQ}=9.43$; with a P value of 0.002 ** which is considered as highly significant.

4. Discussion

Caries is a multifactorial disease and depends on the age, socioeconomic status, diet, brushing frequency, saliva of the patient. With the eruption of permanent first molar, there is establishment of contact point on the distal of 2nd deciduous molar & mesial of 1st permanent molar and there is change in micro-flora of oral cavity⁵.

Difference in pattern of caries in second primary molars observed in the study:

- Increase in proximal caries in deciduous second molars with eruption of permanent first molar
- Increased involvement of distal surfaces in second deciduous molars in Group 2 – with eruption of permanent 1st molars)
- It was suggested that Mandibular molars are more affected with caries than the maxillary molars

5. Conclusion

- 1) Caries was found to be prevalent in 22.5 % in primary second molars in children with Primary dentition in comparison to 40.4% in children with erupted permanent first molar.
- 2) Higher caries occurrence in Mandibular molars (62.9% - Gp I & 67.26% - Gp II) was seen in comparison to maxillary molars
- 3) Primary second molars showed more of distal surfaces involvement in children with erupted permanent first molars (21%) in comparison to children with primary dentition (14%).

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