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RESEARCH ARTICLE

RELATIONSHIP BETWEEN INTERDENTAL SPACING AND DENTAL CARIES IN PRIMARY DENTITION – A RANDOMIZED CONTROL TRIAL

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ABSTRACT

Background: Out of the several factors that contribute to dental caries the alignment of teeth in dental arch plays a pivotal role in dental caries progress. The naturally occurring physiologic space and primate space in primary dentition help in the prevention of caries it avoids retention of plaque in interproximal areas. However, in early childhood caries it is not a reality, so the influence of interdental spacing in spread of dental caries is. **Aim:** The aim of our study is to evaluate the relationship between interdental spacing and dental caries in primary anterior teeth. **Methodology:** A sample of 100 children with primary dentition who are mentally and physically healthy were evaluated for the presence of interdental spacing and dental caries. The presence of interdental spacing and dental caries recorded. Later all the data are compiled and statistical analysis was done. **Statistical Analysis:** The data was statistically analyzed using Chi square test. **Result:** The association between interdental spacing and dental caries was significant in 26% cases, where as in 17% of cases it was highly significant ($p < 0.01$) and in 9% of cases it is significant ($p < 0.05$). The presence of caries is more in classification 3 and 4 (C3 and C4) than classification 1 and 2.

INTRODUCTION

Dental caries in primary dentition is an important matter in the recent years because it may be predictive of later caries and so special attention should be given to overcome this problem.¹ There are many factors that control the development of dental caries in children. The relative influence of each factor differs noticeably in individuals and is not completely recognized. However, the anatomic and morphological features of tooth, such as deep pits and grooves and broad flat proximal contact areas will greatly increase its susceptibility.² The initial occurrence of caries in primary dentition is more on the occlusal surface than the proximal surface. Interproximal caries occur only once the proximal contact develops in both the anterior and buccal segments of the primary dentition.³ In case of absence of interdental spaces may lead to a greater extent of decay in the primary dentition.⁴ Because crowding is said to decrease the accessibility to hygiene measures; thereby, increasing plaque accumulation and promoting caries.² Not many studies have assessed the relationship between the presence/absence of interdental spacing and dental caries in the primary dentition. Therefore, the purpose of the present study was to assess the relationship between interdental spacing and dental caries in the primary anterior dentition.

Aim: The aim of our study was to evaluate the relationship between interdental spacing and dental caries in primary anterior teeth.

Selection criteria

Inclusion criteria: Children having primary dentition with physiological spacing, Children should be mentally healthy and cooperative.

Exclusion criteria: Children with permanent dentition, Children who are systemically compromised, Physically challenged, Medically Compromised, Missing primary teeth with exfoliation, Presence of intraoral swelling and extra oral swelling, Children with supernumerary teeth, fused tooth & teeth in infraocclusion.

MATERIALS AND METHODS

A sample of 100 children with primary anterior dentition who are mentally and physically healthy were evaluated for the presence of interdental spacing and dental caries. The presence of interdental spacing and dental caries was recorded as per the criteria and the relation between the spacing and caries was evaluated by chi square test. Later all the data are compiled and statistical analysis had done. Criteria for interdental space was categorized as follows:

- (1) space > 1 mm,
- (2) space < 1 mm,
- (3) no space, teeth in contact, or
- (4) no space, teeth overlapped.

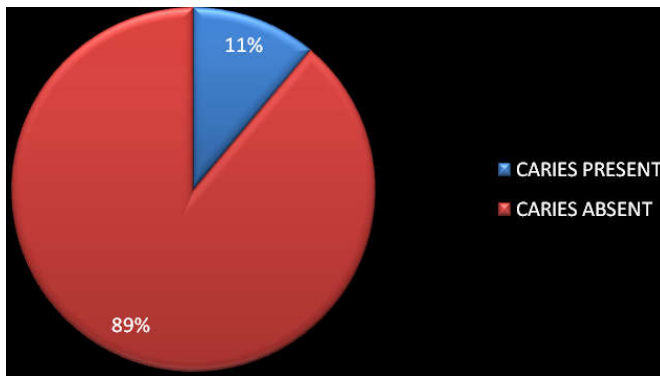
RESULTS

The association between interdental spacing and dental caries was significant in 26% cases, where as in 17% of cases it was highly significant(p<0.01) and in 9% of cases it is significant(p<0.05). The presence of caries is more in classification 3 and 4 (C3 and C4) than classification 1 and 2.

CLASSIFICATION * CARIESPACING Cross tabulation

Classification	Caries		Total
	Present	Absent	
1	15 2.5%	584 97.5%	599 100.0%
2	2 1.8%	107 98.2%	109 100.0%
3	88 31.2%	194 68.8%	282 100.0%
4	6 60.0%	4 40.0%	10 100.0%
Total	111 11.1%	889 88.9%	1000 100.0%

Using Chi-Square Tests p<0.001 Significant Association



DISCUSSION

One of the risk factors in the complex etiology of dental caries is interdental spacing. There can be generalized spacing present between the primary teeth. According to Baume, two consistent morphologic arch forms of the primary dentition are found: either spaces between the teeth were present at all stages (Type I) or the teeth were in proximal contact present at all stages (Type II). Spacing in the primary dentition is apparently congenital rather than developmental. Spaced arches frequently exhibit two distinct diastemas: one between the mandibular canine and the first primary molar and the other between the maxillary lateral and the canine. Baume referred to these spaces as ‘primate spaces’. A secondary spacing of the maxillary primary incisors occasionally occurs when the still underdeveloped maxillary arch is widened somewhat by the eruption of the mandibular permanent central incisors. Hence, in our study children with only primary dentition were selected. In the primary dentition, the occlusal surface is the most susceptible to carious attack, attributable to its anatomy of pits and fissures. However, with the eruption of the permanent first molars, the normal developmental spaces of the primary dentition begin to close. With space closure and formation of the contact areas, the incidence of proximal caries greatly increases. Thus, children aged between 4 and 6 years with no permanent tooth erupted were selected. The complex fissure topography of teeth compounded by gravitational forces could make these teeth more prone to dental caries. Other contributing factors include absence of interdental

spacing, inaccessibility to maintain oral hygiene in these areas and genetic pattern. Almost 78% of the children in the present study had interdental spaces and 22% of the children had absolutely no interdental spaces. In this study, the anterior segments in both arches showed a higher prevalence of spacing and more in mandibular arch than maxillary arch which is in contrast to study done on 3-year-old Danish children showed higher spacing in the maxillary than the mandibular arch.⁵ It is said that tight interdental area enhances colonisation by *S. mutans* on the tooth surface due to increased bacterial adherence and plaque retention together with a decreased carbohydrate clearance. So tight interdental contact can cause early childhood caries in the children as one of the etiological factor of early childhood caries and it is a time-specific interaction of microorganisms with sugars on a tooth surface. Environmental factors such as poor oral hygiene practices promotes the developmental of early childhood caries. Improper alignment of anterior teeth can cause difficulty to maintained oral hygiene, there by colonization of *s. mutans* on the surfaces. Saliva has a protective role against dental caries development by providing the main defense system. Saliva flow rate, antimicrobial properties, the buffering capacity, and clearance of foods from the oral cavity are factors that are important in reducing the development of caries. If there is spacing is present, saliva can easily flush out the debris and thereby reduce the interproximal caries. Feeding of high sugar containing food at night may increase the caries risk for infants, due to the low salivary flow rate.

Classification * caries Cross tabulation in maxilla

Classification	Caries		Total
	Present	Absent	
1	14 4.8%	276 95.2%	290 100.0%
2	1 1.8%	56 98.2%	57 100.0%
3	81 54.0%	69 46.0%	150 100.0%
4	2 66.7%	1 33.3%	3 100.0%
Total	98 19.6%	402 80.4%	500 100.0%

Using Chi-Square Tests p<0.001 significant association

IN MANDIBLE

Classification * CARIESPACING Cross tabulation

Classification	Caries		Total
	Present	Absent	
1	1 .3%	308 99.7%	309 100.0%
2	1 2.0%	50 98.0%	51 100.0%
3	7 5.3%	125 94.7%	132 100.0%
4	4 57.1%	3 42.9%	7 100.0%
Total	13 2.6%	486 97.4%	499 100.0%

Using Chi-Square Tests p<0.001 significant association

The initial arrangement of tooth germs in the maxilla as well as the mandible is an important determinant of interdental spaces. During postnatal development, intensified lateral growth of the alveolar processes was found to occur during the formation of deciduous arches following the period of lactation. Both lateral and frontal growth of the alveolar processes during the

formation of deciduous arches manifest in spaced deciduous anteriors. Apparent spacing of the primary incisors may also occur as a result of occlusal attrition. The wider incisor part of the teeth worn away to leave apparently larger spaces between the narrower remaining parts. Keeping in mind the concerns of exposing children to radiation strictly for research purposes the costs involved and risk of bias from the refusal of some study participants to undergo radiography bitewing radiographs were not utilized for diagnosis of proximal caries in our study. Bitewing radiographs were not utilized for diagnosis of proximal caries in our study.

Conclusion

The present study shows there is association between dental caries and interdental spacing. Interproximal caries also showed an inverse relation with interdental spacing. The present study supports that absence of interdental spaces in the primary anterior dentition can be considered as high risk group, so special care is to be given as preventive protocol of these high caries risk children.

Conflict of interest: There is no conflict of interest.

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