

# Attachment of Maxillary Frenum and Occurrence of Midline Diastema in Children

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## Abstract

### **Aim:**

The aim of my study is to find out the attachment of maxillary frenum and the presence of midline diastema in school children.

### **Background:**

The maxillary labial frenum is a fold of the mucous membrane connecting the lip to the alveolar process. The maxillary frenum often attaches to the centre of the upper lip and between the upper two front teeth. Incidences of improper attachment of the frenum is a common problem occurring in children than in adults. Midline diastema is a rather common form of incomplete occlusion characterized by a space between the maxillary and less frequent mandibular central incisors. It always creates an unpleasant appearance and interferes with speech depending on its width. The purpose of this study is to find the influence of the maxillary frenum in the development of midline diastema in school children.

### **Materials and methods:**

This study involves healthy patients who have come to Saveetha dental college for dental checkup. This study involves a questionnaire which consists of questions based on the type of frenum attachment and the presence or absence of midline diastema.

### **Result**

The study was carried in healthy patients who have come to the department of pedodontic in Saveetha dental college. It is seen in this study that 151 out of 200 children had the prevalence of midline diastema. The most common type of frenal attachment seen in children is the mucosal type. The type of frenum attachment which is associated with the development of midline diastema in children is type 2 and type 3.

### **Discussion**

In children an abnormal attachment of maxillary frenum has the potential to become a significant factor in contributing to midline diastema in the maxilla. This is due to the influence of the frenum penetrating inbetween the upper central incisors leading to the occurrence of midline diastema.

**Keywords:** labial frenum, midline diastema, infant development.

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## INTRODUCTION

Midline diastema is defined as a space greater than 0.5mm between the proximal surfaces of adjacent teeth. Angle (1907) described the dental midline diastema as rather common form of incomplete occlusion characterized by a space between the maxillary and less frequent –mandibular central incisor.[1] Usually the space exists between the two central incisors. Midline diastema always creates an unpleasant appearance and interferes with speech depending on its width.

The maxillary midline diastema is, indisputably, one of the dentoalveolar disorders that cause special concern to parents and patients, specifically given its position. [2] The presence of maxillary midline diastema is a normal characteristic in the development of the stomatognathic system in the mixed dentition period, especially in the initial phase of the eruption of permanent maxillary central incisors (“ugly duckling” stage).

Future problems that may develop in which the maxillary labial frenum may be a contributing factor includes: dental decay on the upper front teeth, diastemas between the two front teeth, orthodontic or periodontal problems later in the child’s oral development, poor lip mobility or function,

especially during smiling and speaking. [3] The maxillary frenum restrictions may occur by themselves or in conjunction with tongue-ties and can easily be revised.[4]

The anterior frenum is a combination of epithelium and loose connective tissue.[5] In some instances, frenum may include muscle fibres originating from the orbicularis oris muscle of the upper lip. Maxillary frenum is a soft tissue structure that may exhibit the most diverse types. The frenum may attach at variable locations in the attached gingiva and the anterior papillae inserting into the palate. There are different type of classification of the labial frenum. The labial frenum is a dynamic and changeable structure [6] and is subject to variation in shape, size, and position during the different stages of growth and development.[7,8] The one introduced by Placek is a morphological-functional classification of the type of the labial frenum attachment, aiming to help clinicians identify functional problems that require intervention. The four types of frenum attachment are defined as mucosal, gingival, papillary, and papillary penetrating, depending on whether the attachment is located in the mucogingival junction, the attached gingiva, the interdental papilla, and through the interdental papilla right up to the palate,

accordingly. In some instances the frenum may be completely absent<sup>[9]</sup>.

An existence of diastema between the maxillary incisors may be a normal growth stage. During mixed dentition stage of tooth eruption often reveals that this gap closes spontaneously as the remaining anterior teeth erupt.[10] An abnormally placed frenum may influence the growth and development of the anterior portion of the maxillary arch. It is important to understand the cause of the particular condition in order to undertake its proper treatment.[11] The purpose of this study is evaluate the influence of type of attachment of maxillary frenum on the presence of midline diastema in children below 16 yrs of age.

**MATERIALS AND METHODS:**

The present study was designed to be a prospective observational study supported by a formulated questionnaire for finding out the type of maxillary frenum and the presence of midline diastema in children. The participants for the study were the children who visited Saveetha dental college for dental treatment. The study was carried out from November 2014 to May 2015. During this period of the study, 200 children of the age grup 7-15 yrs were approached out of which 120 were boys and 80 were girls . Data was collected by a single investigator. The study was carried out using a questionnaire. The questionnaire was filled by finding out the hard tissue examination of the child was done using a Mouth mirror and probe under natural light. This examination helped to find the presence of midline diastema and also the type of frenum attachment. The maxillary labial frenum is a fold of the

mucous membrane connecting the lip to the alveolar process. It consists mainly of connective tissue and epithelium, with some nerve fibers. There are different types of frenal attachment. Based on planks classification of labial frenum, the four types of frenum attachment are defined as mucosal, gingival, papillary, and papillary penetrating, depending on whether the attachment is located in the mucogingival junction, the attached gingiva, the interdental papilla, and through the interdental papilla right up to the palate, accordingly.

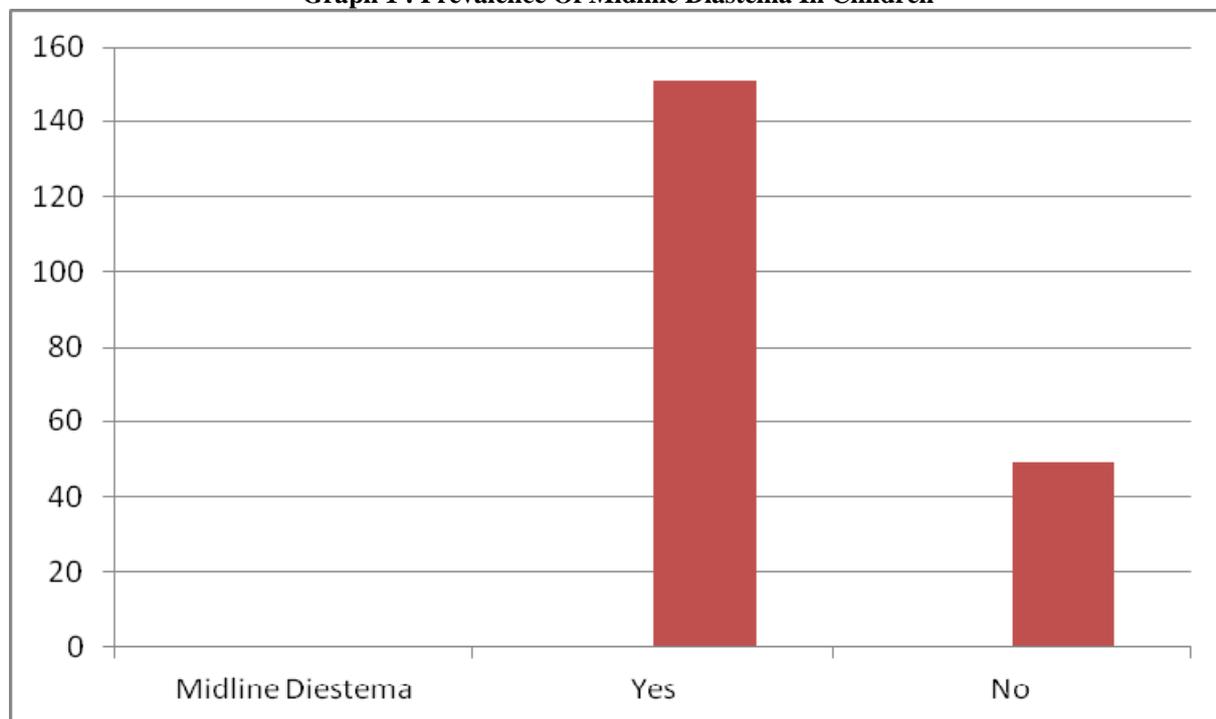
The data obtained from 200 questionnaire were tabulated and statistical analyses was done using SPSS version. While P <5 value was considered to be significant, the chi-square test was applied to investigate the association between the results and the gender, pattern of frenum attachment and presence of midline diastema.

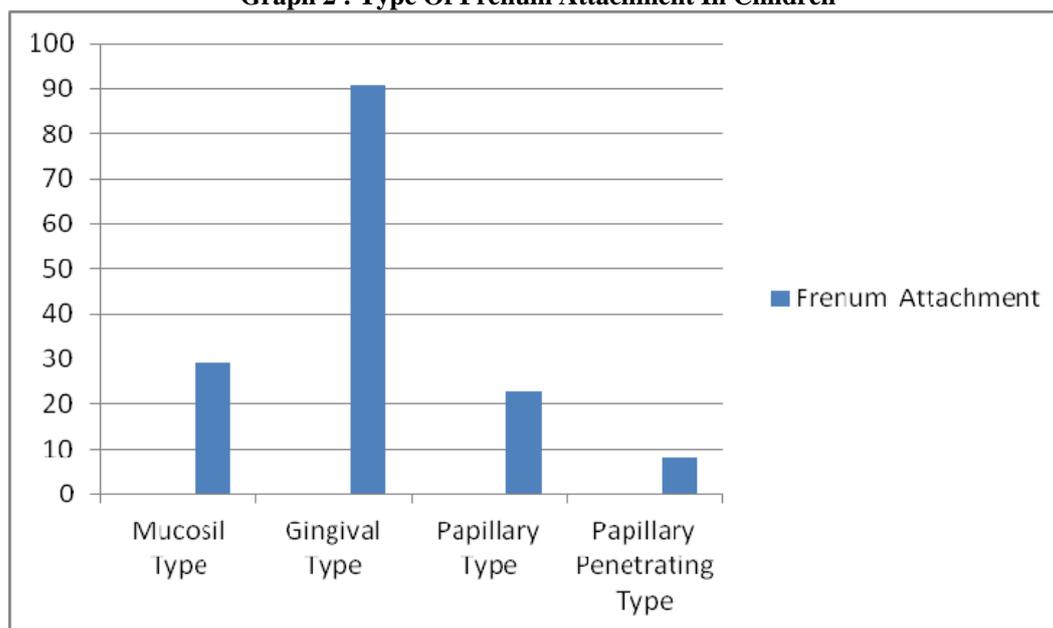
**RESULT:**

In this study all children are below the age of 16 years. Out of 200 children examined, 151 children presented with midline diastema. On further examination of the type of maxillary labial frenum 52 children have type 1 frenum attachment, 100 children have type 2 frenum attachment, 36 children have type 3 frenum attachment and 12 children have type 4 frenum attachment.(Graph 1)

On further examination, out of 52 children with class 1 frenum 29 were found to have midline diastema, 91 of 100 with class 2 frenal attachment have midline diastema, 23 of 34 with class 3 frenal attachment have midline diastema and 8 of 12 with class 4 have midline diastema.(Graph 2)

**Graph 1 : Prevalence Of Midline Diastema In Children**



**Graph 2 : Type Of Frenum Attachment In Children****DISCUSSION:**

The midline diastema is a space (or gap) greater than 0.5mm between the mesial surfaces of maxillary central incisors. The space can be a normal growth characteristic during the primary and mixed dentition and generally is closed by the time the maxillary canines erupt. For most children, with the eruption of canine normal closure of this space occurs. For some individuals, however, the diastema does not close spontaneously.[12]

Midline diastema's can be genetical, physiological, dentoalveolar, due to a missing tooth, due to peg shaped lateral, midline supernumerary teeth, proclination of the upper labial segment, prominent frenum and due to a self-inflicted pathology by tongue piercing.[13,14]

This study mainly aim to investigate the pattern of frenum attachment and its influence in the development of midline diastema in children. Out of 200 children examined, 151 children were found to have midline distema. Midline diastema may most commonly occur during the beginning of permanent dentition period and it is also influenced by the type of frenum attachment. In our study it was reported that some children with a frenaum attachment other than class 1 were reported to have midline diastema. The prevalence of midline diastema is a common problem mostly affecting younger children. Midline diastema occurring in children might be due to various reasons such as the frenum attachment, presence of caries, feeding habits etc.

The type 2 and 3 frenum attachment in a child has the potential to create midline diastema if the upper lip is abnormally restricted. This study shows a significant difference in the pattern and the type of frenum attachment associated with midline diastema in children. More than fifty percent of the children in our study showed increased risk of the presence of midline diastema.

A similar study was done by Kaimenyi[15] to determine the presence of midline diastema, tongue tie and frenum attachments amongst school children in Nairobi. The result

of the study revealed the presence of midline diastema in maxilla is associated with gingival type of frenum attachment. Another cross sectional study of midline diastema was conducted in children in Greece by Elizabeth A Boutsis [16] showed that presence of midline diastema is associated with papillary penetrating type of frenum attachment.

Reports shows that there was an increase in the presence of midline diastema in children with type 2 and type 3 frenum attachment, but in previous studies it was reported to be associated with type 3 and type 4 frenum attachment.

Based on the study, it shows that the presence of midline diastema is due to the abnormal attachment of the maxillary labial frenum. The child's mother should be cautious and practice good oral hygiene during the later stages of mixed dentition and early stages of development of permanent teeth. If a parent sees any signs of abnormal eruption of the teeth, any spaces in the upper and lower teeth, a visit to a dentist should occur followed by any needed corrective care.

Even though the abnormal attachment of the frenum is corrected and the midline diastema is treated, timely and appropriate parent counselling about maintaining proper oral hygiene are certainly recommended. Hopefully these results should reassure concerned parents about the benefits of dental treatment for the children to prevent from further problems.

This problem can be minimised by correcting the defect in the frenal attachment surgically by performing frenectomy and the midline diastema by undergoing orthodontic treatment.[17]

**CONCLUSION:**

Gingival and papillary penetrating maxillary frenal attachment have the potential to become a significant factor contributing to development of midline diastema in upper anterior teeth.

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