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Abnormal Frenal Attachment and Analysis of Orthodntists Considerations of Determining but Over Looked Element

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ABSTRACT

Background and objectives: The aim of this study was to analyse the current clinical views of orthodontists on the periodontal impact of abnormal frenal attachments on various malocclusions and to gather the views of orthodontists, pan india on the management of abnormal frenal attachment.,

Material and method:- A questionnaire containing 15 statements was sent to orthodontists all over india. the questionnaire covered demographics, orthodontists' experience, questions regarding abnormal frenal attachments, its occurrence in various syndromes and questions regarding its management.

Results-. A hundred orthodontists with a range of backgrounds and experiences were chosen for this study. it was found that the choice of surgical intervention to correct midline diastema depended on the amount of midline diastema. 86% thought that papilla and papillary penetrating frenum was potentially pathological. 67% were able to link aberrant frenal attachments to syndromes such as holoprosencephaly and ellis-van creveld syndrome (evcs). 83% agreed on the blanch test as their test of choice to diagnose abnormal frenal attachments. 79 % of the orthodontists chose to check buccal tie by visual inspection but the correct method to diagnose this is by palpation or finger sweep. mostly all orthodontists agreed on the negative effects of abnormal labial frenal attachment, timing of frenectomy and that retention should include both bonded and removable retainers.

Conclusion- The following study was conducted to gather the current clinical views of orthodontists in india regarding the periodontal impact of abnormal frenal attachments on various malocclusions. although most of the orthodontists agreed that if the diastema was large and frenal attachments are thick, it may not be possible to completely close the space before surgical intervention. the space could be closed partially, followed by surgical intervention and orthodontic movement to bring the teeth together should resume immediately after the frenectomy. this is done so that the teeth are brought together quickly after the procedure. this causes the healing to occur with the teeth together which would result in the post-surgical scar tissue stabilizing the teeth instead of creating obstacles to final closure of the space.

Keywords: *Frenectomy; Median diastema; Retention; Diagnosis; Blanche test*

1. INTRODUCTION

An abnormal labial frenum is considered to be a potential cause of median diastema and has been attributed to be a source of relapse after closure with orthodontic treatment. The maxillary labial frenum is formed by a fold of mucous membrane, connective tissue and sometimes a few fibres of the nasolabial muscles that attach to the philtrum of the upper lip, alveolar mucosa and underlying periosteum.4 Mirko at al5 developed an anatomical classification of labial frenum based on its insertion point and categorized the frenum with papillary insertion labially between teeth and at palatal papillae as abnormal. Midline bony clefts can be associated with an abnormal frenum as its fibrous tissue inserts into the notch in the alveolar bone.6 This inter crestal bony cleft may keep the teeth apart and also interrupt the formation of transeptal fibers.7-8 Edward also defined a hyper tropic, stiff fibrotic and fan shaped frenum as abnormal since it could hinder the closing of median diastema.9-12 Diastemas are a major aesthetic concern for patients and parents. They are frequently seen in mixed and permanent dentition stage and are an important reason for seeking orthodontic treatment for their closure.13-15 Dentoalveolar disparity, supernumerary teeth, hypodontia, thumb sucking and tongue thrusting practices are among the main etiological factors of median diastema.

Even though there are different functional classifications of frenum attachment not all frenum attachment are treated the same in terms of modality and time. Various orthodontists may have an individualistic approach towards the management of aberrant frenum attachment during orthodontic treatment.42-44 Smaller diastemas with minor frenum attachment can be managed by using removable orthodontics..7-8 Edward also defined a hyper tropic, stiff fibrotic and fan shaped frenum as abnormal since it could hinder the closing of median diastema.9-12 Diastemas are a major aesthetic concern for patients and parents. They are frequently seen in mixed and permanent dentition stage and are an important reason for seeking orthodontic treatment for their closure.13-15 Dentoalveolar disparity, supernumerary teeth, hypodontia, thumb sucking and tongue thrusting practices are among the main etiological factors of median diastema.

Even though there are different functional classifications of frenum attachment not all frenum attachment are treated the same in terms of modality and time. Various orthodontists may have an individualistic approach towards the management of aberrant frenum attachment during orthodontic treatment.42-44 Smaller diastemas with minor frenum attachment can be managed by using removable orthodontics. Whereas, Low and wide frenum attachments may need fixed orthodontic intervention for correcting and controlling crown and root angulations and maintaining permanent retention. Treatment modalities may also include some proposed surgical procedures like frenectomy, interdental corticotomy and glossectomy.45-49As there is strong association between diastema, orthodontic treatment relapse and aberrant frenum attachment, a good individualistic disciplinary approach by orthodontists is beneficial for the patient in their management. Proper case selection, appropriate treatment selection, adequate patient cooperation and good oral hygiene are all important criteria to be considered by orthodontists during the management of aberrant frenum attachment.50-52

The present study aims at evaluating the analytical perception of many orthodontists pan India in their approach towards the interdisciplinary treatment, related to aberrant frenal attachments and fixed orthodontic treatment. Some variations exist among orthodontists in terms of diagnosis, indications, and timing of frenectomy as well as post orthodontic retention of median diastema. High-quality studies are required to provide supporting evidence for the development of guidelines for the same.

2. MATERIAL AND METHODOLOGY

COLLECTION OF DATA

Source of data: It is a Cross sectional, qualitative survey-based study. Close ended questions were framed and a questionnaire was filled by responding orthodontists working in both government and private sectors.

INCLUSION CRITERIA

1. Dentists with a doctorate or master's degree include in orthodontics
2. Orthodontists and academicians with valid dental council registrations and significant amount of work experience.
3. Clinical practitioners from both the government and private sectors in Indi

EXCLUSION CRITERIA

1. The study did not include dental undergraduates, ayurvedic, homoeopathic, Unani, and non-allopathy practitioners.
2. Orthodontists who did not have valid dental council registration. The data obtained was analysed using the SPSS

(Statistical package for social sciences) version, chi-square test was used to find the statistical significance among responses of the orthodontists based on orthodontic

METHOD OF DATA COLLECTION:

The survey was done online via a google form. Our survey included 100 orthodontists from both the government and private sectors.

We used google40 forms survey method because they have the following advantages,

- They offer Unlimited survey
- They allow Unlimited respondents
- The Survey answers and data are automatically collected in Google Spreadsheets
- There are a lot of theme options
- Custom logo can be designed
- We can Add images or videos
- We can Skip logic and page branching
- We can embed survey into emails or websites
- We can Add collaborators
- It is 100% free!
- Graphic representation can be done by google

SAMPLE SIZE DISTRIBUTION

The sample size was calculated using G*Power 3.1.9.7 software.

The input parameters:

Effect size- 0.5 (Large, according to Cohen)

α probability error- 0.05

Power (1-β error probability)- 0.95

Number of groups- 2

Df- 5

Output parameters:

Sample size- 92

Thus, minimum required sample size is 100.

Questions	p-value
Which type of maxillary labial frenum attachment is considered as potentially pathological?	0.423
Current clinical view of orthodontist on agreement that abnormal frenal attachment can be syndromic, if yes, and then which syndromes are associated with it?	0.008
Which diagnostic criteria is helpful for identifying abnormal maxillary labial frenum attachment	0.000
Current clinical view of orthodontist on what assessment technique do they use to check for buccal tie	0.143
Current clinical view of orthodontist on which diagnostic criteria is helpful in identifying abnormal mandibular lingual frenum attachment?	0.02

3. RESULTS

When asked when frenectomy should be performed in relation to orthodontic space closure, 5% of participants (group I–5%, group II–0%) responded, "Prior to beginning orthodontic treatment, Just prior to diastema closure, 8% (group I-6, group II-2%), and 85% (group I-84%, group II-1%). Following diastema closure, 2% (Group I) stated that the groups' differences in thickness were statistically significant (p-0.002).

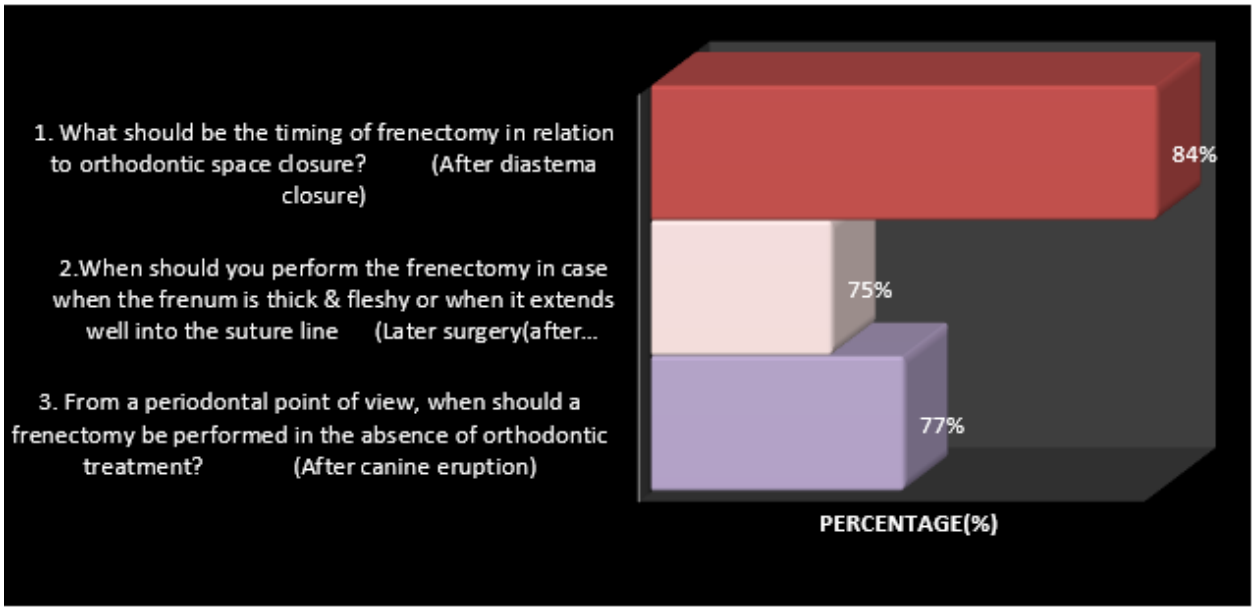
In response to our question regarding when to perform a frenectomy when the frenum is thick and fleshy or extends well into the suture line, 18% of participants (group I-18%, group II-0%) said early surgery [before orthodontic space closure], 78% (group I-75%, group II-3%) said later surgery [after orthodontic space closure], 3% said time does not matter, and 1% (group I) said none of the above. The difference between the groups was not statistically significant (p-0.832).

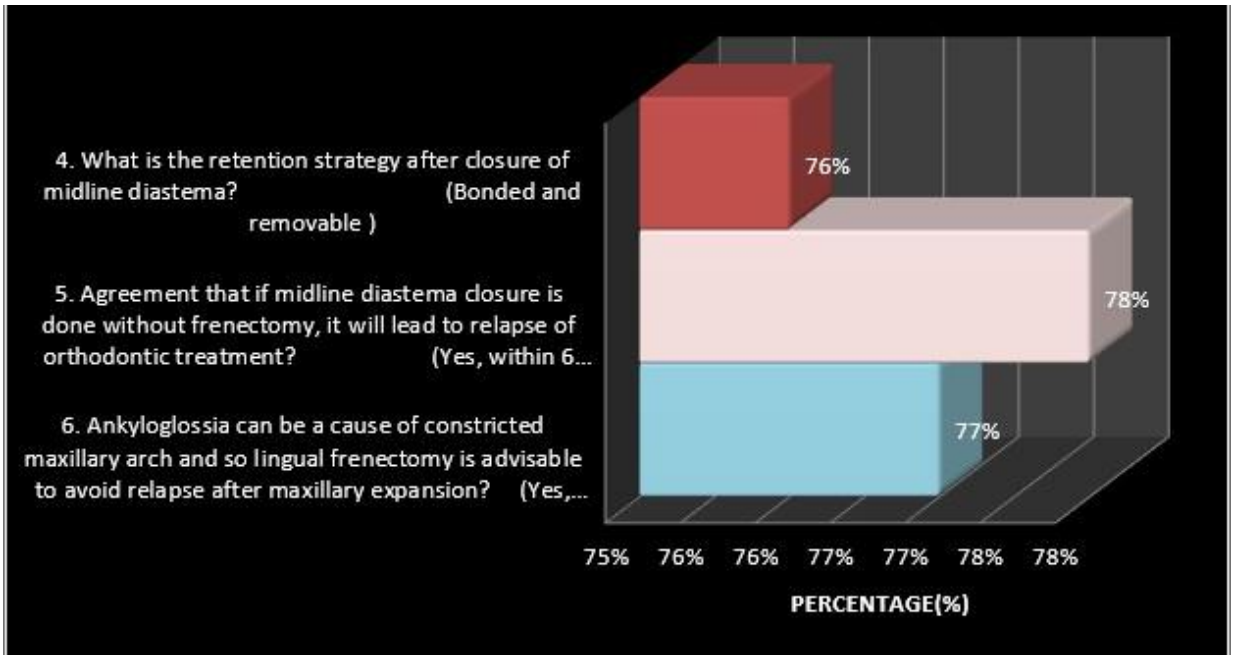
When asked when a frenectomy should be done without orthodontic treatment, 5% of participants (group I-5%, group II-0%) said before canine eruption, 78% (group I-77%, group II-1%) said after canine eruption, 9% (group I-8%, group II-1%) said at any time of diagnosis, and 8% (group I-7%, group II-1%) said patient age is more important than dental development. The difference between the groups was not statistically significant (p-0.141).

In response to our question on the retention technique following the closure of the midline diastema, 14% of participants (group I–12%, group II–2%) said bonded retainers, 9% (group I–9%, group II–0%) said removable [Hawley, essix], and 9% said (group I–8%, group II–1%). Although 77% of respondents (Group I-76%, Group II-1%), at any point during the diagnosing process, stated that they were bonded and detachable, the difference between the groups was statistically significant (p-0.028).

12% of participants (group I-12%, group II-0%) responded that midline diastema closure without frenectomy would result in a relapse of orthodontic treatment after three months, 80% (group I-78%, group II-2%), and 6% (group I-5%, group II-1%). A little over 2% (Group I: 2%, Group II: 0%) responded that the groups' differences were not statistically significant (p-0.226).

When ask ankyloglossia can be a cause of constricted maxillary arch and so lingual frenectomy is advisable to avoid relapse after maxillary expansion 79% (group I-77%, group II-2%) of participants, said "yes, always," 7% (group I-7%, group II-0%) said "never," and 9% said "yes, always" when we asked if ankyloglossia can result in constricted maxillary arch and that lingual frenectomy is recommended to prevent relapse after maxillary expansion. There was no statistically significant difference between the groups (p-0.137), with 5% (Group I-4%, Group II-1%) stating that the difference was most of the time.





Statistical Analysis

The data analysis was done using Statistical Package for Social Sciences (SPSS) version 26.0 (IBM, Chicago, IL, USA). Data analysis was done using frequency distribution and differences between the two groups were determined by using the chi-square test. For all statistical purposes a $p < 0.05$ was considered to be statistically significant.

4. DISCUSSION

This study was done to analyze and integrate the current clinical views of orthodontists on the periodontal impact of abnormal frenal attachments on various malocclusions. There has been a majority opinion among orthodontists regarding the etiological contribution of the abnormal labial frenum in the development of median diastema. A labial frenum that fits into a notch in the midline alveolar bone might cause a median diastema.86 The midline cleft separates the central incisors and prevents the development of transseptal fibers. This results in a median diastema in the permanent dentition.87 Angle and Edwards suggested abnormal frenum as a cause of median diastema and advised frenectomy as the treatment of choice. Similar studies have been done by Jonathan et al. and Popovich et al.88 A similar study done in the UK showed that three-quarters of the orthodontists would consider frenectomy in conjunction with orthodontic closure of median diastema; however, variations existed regarding the timing of frenectomy.94 Eighty-eight percent of US orthodontists preferred to perform frenectomy

after orthodontic space closure, followed by frenectomy first (8%). In comparison, 43.3% of the UK orthodontists preferred performing frenectomy before starting orthodontic treatment or just before closure of median diastema, followed by the preference of frenectomy after space closure (42.5%). Three percent of the US orthodontists and 14% of the UK orthodontists reported that surgical timing is not important, and frenectomy can be done at any time. The rationale for closure of median diastema prior to frenectomy is to improve the stability of space closure by consolidating the teeth with scar tissues forming around the surgical site. Some recommend frenectomy before commencing closure of median diastema, especially where the frenum is thick and bulky and space closure may cause discomfort. In addition, it is suggested that the frenum resists mesial pressure, and frenectomy before orthodontic closure could lead to faster tooth movement.95 One concern with this approach is that with early frenectomy, old scar tissue may impede orthodontic space closure. Sixty-seven percent of the orthodontists would not consider frenectomy without orthodontic treatment, and most orthodontists in the US survey-based study supported this.

The results of this study showed the current clinical view of orthodontists in India. It was found that if the diastema is small, it is usually possible to bring the central incisors completely together before surgery. If the space is large and frenal attachment is thick, it may not possible to completely close the space before surgical intervention.

The space should be closed partially and the orthodontic movement to bring the teeth together should be resumed immediately after the frenectomy, so that the teeth are brought together quickly after the procedure. When this is done, healing occurs with the teeth together and the inevitable post-surgical scar tissue stabilizes the teeth instead of creating obstacles to final closure of the space.

5. CONCLUSION

The following study was conducted to gather the current clinical views of orthodontists in India regarding the periodontal impact of abnormal frenal attachments on various malocclusions. A questionnaire was formulated and circulated amongst 100 orthodontists and their responses were collected and analyzed. We chose to divide the 100 orthodontists on the basis of their number of years of experience.

Most of the orthodontists agreed that if the diastema is small, it is usually possible to bring the central incisors together before surgery. If the diastema is large and frenal attachments are thick, it may not be possible to completely close the space before surgical intervention. The space could be closed partially, followed by surgical intervention and orthodontic movement to bring the teeth together should be resumed immediately after the frenectomy. This is done so that the teeth are brought together quickly after the procedure. This causes the healing to occur with the teeth together which would result in the post-surgical scar tissue stabilizing the teeth instead of creating obstacles to final closure of the space. Some variations exist among orthodontists in terms of diagnosis, indications, and timing of frenectomy as well as post orthodontic retention of median diastema.

High-quality studies are required to provide supporting evidence for the development of guidelines.

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