doi:10.5368/aedj.2011.3.1.1.7

PROGNOSIS V/S ETIOLOGY: MIDLINE PAPILLA RECONSTRUCTION AFTER CLOSURE OF MEDIAN DIASTEMA

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ABSTRACT

Reconstruction of lost interdental papilla once the contact point is restored in midline diastema cases are as well important in restoring the esthetics as closure of diastema. **Aim**: The purpose of this study was to predict the midline papilla reconstruction in treated median diastema of variable etiology. **Method**: The treated sample consisted of 40 patients with variable etiology of midline diastema (6 of abnormal labial frenum, 6 of mesiodens ,8 of anodontia or microdontia, 8 of para functional habits, 6 of flared or rotated incisors and 6 of dentoalveolar disproportion) with otherwise healthy periodontium. The method used was PPI (papilla presence index) by D.Cardaropoli. **Results**: The study suggests that prognosis for papillary reconstruction is not good in cases of mesiodens. **Conclusion**: In spite of getting a good contact point, various other factors are playing a role in achieving good esthetics in cases of median diastema.

KEY WORDS: Interdental papilla, Diastema , papilla presence Index.

INTRODUCTION

A diastema is defined as a space greater than 0.5 millimeter between the proximal surfaces of adjacent teeth.¹ Maxillary midline diastema is common in primary mixed dentitions. It is termed as "developmental ", reflecting the spontaneous partial or complete closure that occurs with eruption of permanent lateral incisor and canine. In adult dentition reported incidence ranges from 5% to 20%.² Suggested causes include missing or undersized lateral incisors; mesiodens; Para functional habits such as thumb sucking, mouth breathing and tongue thrusting, flared or rotated incisors, anodontia ; macroglossia; dentoalveolar disproportion; localized spacing; closed bite; ethnic and familial characteristic and midline pathology.

The loss of contact between central incisor results in recession of interdental papillae that can alter the appearance of esthetic zone. The presence or absence of the interdental papilla is a topic of great concern. Increase of papilla absence with opening of so called " black triangles" or black spaces both esthetics and functional problems can develop.³ Recontruction of lost interdental papillae once the contact point is restored in midline diastema cases as well important in restoring the esthetic as closure of diastema.

Some time the loss of the papilla is a consequence of periodontal disease because of gingival inflammation, attachment loss and interproximal bone height resorption. Missing papillae can also results from periodontal surgical therapy as the soft tissue usually contract during the healing period.

The purpose of the present study was to determine the role of various etiological factors associated with midline diastema in achieving satisfactory interdental papillae.

Materials and Methods

Cases were selected from the patients who report to the department of Orthodontics IDS Bareilly for the routine orthodontic treatment need.









Fig.2A. Median diastema Fig.1B. Midline diastema closed with Fig.1C development & Flared anteriors .022 x .028 PEA Fig.2. Midline diastema case due to lingually displaced lateral incisor

Fig.1C. Post treatment



Fig.3A. Median diastema due to missing 12 and 22



Fig.3B. Midline diastema closed with .022 x .028 PEA

Fig.3. Midline diastema due to missing lateral incisors

Cases were screened for the following inclusion criteria:-

- In the pre treatment records complete eruption of the maxillary permanent canine (to exclude the developmental median diastema)
- Maxillary median diastema equal or greater than 2mm at pretreatment level
- Complete closure of median diastema in post treatment records.
- Removal of etiology before, during and after active orthodontic treatment was made sure.

The sample consisted of 40 patient of midline diastema due to variable etiology (6 of abnormal labial frenum, 6 of mesiodens, 8 of anodontia or microdontia, and 8 of para functional habits, 6 of flared or rotated central and 6 of dentoalveolar disproportion with otherwise healthy periodontium [Table1]. All the patients had been treated with PEA using bonded appliance with .022 x .028 slots(Fig.1 Fig.2 and Fig.3.). All cases were followed by lingual bonded retainer. Certain variables were recorded before treatment (T1), after treatment (T2), after the period of retention (T3) [Table.2]. Once the contact point is restored with closure of diastema; reconstruction of midline interdental papilla is judged on the basis of PPI(Papillae presence index) by D.Cardaropoli³. This classification system is based on the positional relationship among the papilla, cementoenamel junction (C E J) and adjacent teeth.

PPI 1	is reported when the papilla is completely present and coronally extends to the contact point to completely fill the interproximal embrasure. This papilla is at the same level as the adjacent papillae,
PPI 2	describes papillae that is no longer completely present and lies apical to the contact point. This papillae is not at the same level as the adjacent papillae and the embrasure is no longer completely filled but the interproximal (iCEJ) is still not visible
PPI 3	refers to the situation in which the papilla is moved more apical and iCEJ becomes visible. This situation is compatible with a great amount of interdental soft tissue recession.
PPI4	describes when the papilla lies apical to both iCEJ and buccal CEJ (bCEJ). Interproximal soft tissue recession is present together with buccal gingival recession and patient's esthetics is compromised.

Results

Data analysis has suggested that papillae presence index (PPI) at T2 and T3 has been influenced by various factors. Subjects showing PPI 4 at T1 (7 individuals 18%) has only reached to the score of PPI 2 at T2 which does not vary at T3. Subjects judged having PPI 2 and PPI3 at T1, (28 individual) have achieved score of PPI 1 at T2 and T3.

- Diastema width greater than 3.5 mm at T1 also fails to achieve PPI1 at T2& T3
- Bite depth more than 4mm also remains a variable influencing the favorable out come of PPI at T2 and T3.

Two etiological categories most influencing the PPI at T2 and T3 are presence of mesiodens and high labial frenum with an osseous cleft. These cases had compromised esthetics and measured score of PPI 2 at T2 and T3.

Discussion

The absence or loss of interdental papillae is one of the most concerning aspects in the decision making process of clinicians and in gaining acceptance from the patients. This condition may create esthetic impairment, phonetic problems, and food impactions.^{4,5}

Various studies suggest that about 10% of orthodontic patients present with a maxillary median diastema of at least 0.5mm.² Cases presenting diastema associated with lost median papilla represent considerable clinical problem as even after orthodontic closure of diastema, esthetics is jeopardized if the reconstruction of median papilla is not achieved.

The purpose of this study was to evaluate whether the etiological factor and few other variables were significantly associated with the restorations of inter proximal papilla. Our result invariably suggests that cases with mesiodens were not able to restore the papilla. The reason behind this finding could be possible loss of interdental crest of bone during surgical extraction procedure of supernumerary teeth. It is also quoted in other studies that when the distance between the contact point and crest of the bone was 7mm or more the papilla was missing⁵, Other etiological factor which is adversely affecting the restoration of median papilla after closure of diastema in abnormal labial frenum with osseous cleft is also justifying the same theory of height of crest of the bone.

Original article

Unfavorable consequence in relation of median papillae reconstruction appears to be associated with closed type of over bite and deep overbite. Ngom PI and Diagne F in a study have reported deep overbite to be significantly correlated with clinical attachment loss, but not with hygiene and inflammation.^{7,8} As experienced by others, we did find bite depth as a risk factor. These results may simply suggestive of possible trauma to the gingival tissue by insical edges adversely affect the median papillae.

One more pretreatment variable in our study belong to the category of compromised esthetics at T2 & T3. Subjects scoring badly for median papilla at pretreatment level could not achieve the best scores after treatment. This finding confirms the established explanation that severity does affect the results. Same explanation justifies the direct correlation of diastema width at T1 to PPI score at T2 and T3.

Although more and more sophisticated approaches showing good clinical results have been proposed to close the diastema and to restore the lost interdental papilla, predictability can not be guaranteed. Prognosis towards the esthetic restoration of maxillary front region can be anticipated upto a limit depending on the underlying etiology. As the study suggests care must be taken towards least possible trauma to interdental bone.

References:

1. Nainar S M; Gnanasundaram N. Incidence and etiology of midline diastema in a population in south India (Madras), Angle orthod, 1989;59(4):277-82. PMid:2596749

 Shashua D, Artun J, Odont, Relapse after orthodontic correction of maxillary median diastema : A follow up evaluation of consecutive cases, AngleOrthodontics,1999;69(3);257-63.
PMid:10371432

3. Cardaropoli D, Stefania R, Corrente G., and The Papilla Presence Index (PPI): A New System to Assess Interproximal Papillary levels, Int J Periodontics Restorative Dent. 2004; 24; 488-92 PMid:15506030

4. Baum A.T. The midline diastema. J Oral med, 1966;21: 30-39. PMid:4951230

5. Prato G P, Rotundo;R, Cortellini P. Interdental Papila Management: A Review and classification of the therapeutic Approches, Int Journal Periodontics Restorative Dent 2004;24:246-55 PMid:15227772

6. Tarnow D.P, Magner A.W; Fletcher P The effect of distance from the contact point to the crest of the bone on the presence and absence of the interproximal Dental papilla; J Periodontal, 1992; 63:995-96. doi:10.1902/jop.1992.63.12.995PMid:1474471

7. Ngom P.I; Diagne F. Intraarch and Interarch Relationship of the anterior teeth and periodontal conditions. Angle Orthod 2006;76:236-42 PMid:16539547

8. Inocencio F; Sandhu H.S. Interdental Papilla Reconstruction Combining Periodontal and Orthodontic Therapy in Adult Periodontal Patients: A Case Report JCDA 2008 Vol 74; No 6:531-34.

Annals and Essences of Dentistry

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