Case study

Diastema closure through Z plasty frenectomy technique and composite build-up – A case report.

Abstract

Introduction- Patient's aesthetic concern in dentistry is very important now a days and increasing in day-to-day life. Now a day's those who having aesthetic problems are demanding aesthetic dentistry with minimally invasive procedure and they also want immediate results. Frenum is a mucous membrane fold that attaches cheek and lips to the alveolar mucosa, gingiva, and the underlying periosteum. This aberrant maxillary labial frenum can contribute to midline diastema and can also affect the orthodontic treatment outcomes. This aberrant maxillary labial frenum can be treated by frenectomy procedure and midline diastema can be corrected successfully further by composite build up.

Key words- Z-plasty, composite build up, midline diastema

Introduction

Now a day's patients are more concerned about their aesthetic appearance. Maxillary anterior spacing or diastema is a common aesthetic complaint of patients[1]. Keene described midline diastema as anterior midline spacing greater than 0.5 mm between the proximal surfaces of adjacent teeth [2]. It was reported in many studies that maxilla has a higher prevalence of midline diastema than mandible [3]. The midline diastema has a multifactorial etiology. In addition to the labial frenulum, microdontia, mesiodens, peg-shaped lateral incisors, lateral incisor agenesis, cysts in the midline region, habits such as finger sucking, tongue thrusting, and/or lip sucking, dental malformations, genetics, maxillary incisor proclination, and dental-skeletal discrepancies are the factors that can cause diastema [4]. The presence of an aberrant frenum is being considered as main aetiological factor for midline diastema [5]. when these aberrant frenum are closely attached to gingival margin they may cause gingival recession[6].

Depending upon the extension of attachment of fibers, frenum have been classified as:[7]

1. Mucosal – when the frenal fibers are attached up to mucogingival junction;
2. Gingival – when fibers are inserted within attached gingiva
3. Papillary – when fibers are extending into interdental papilla; and
4. Papilla penetrating – when the frenal fibers cross the alveolar process and extend up to palatine papilla.

Prevalence of various frenal attachments includes,[8]

- mucosal attachment - 46.5%,
- gingival attachment-34.3%,
- papillary attachment -3.1%,
- papilla penetrating attachment - 16.1%.

Frenal attachments encroaching on the marginal gingiva leads to distention of the gingival sulcus, and further leads to plaque accumulation, increasing the rate of progression of gingival recession and thereby may lead to recurrence after treatment[9].

Papillary and papilla penetrating frenum are clinically considered as pathological. Papillary and papilla penetrating frenum have been found to be associated with loss of papilla, recession, diastema, difficulty in brushing, alignment of teeth, and psychological disturbances to individual[10]. Abnormal or aberrant frenum are detected visually by tension test, in this test tension is applied over frenum to see the movement of papillary tip or blanch produced due to ischemia of the region [10]. In such cases, it is necessary to perform a frenectomy for aesthetic, psychological, and functional reasons. Frenectomy can be accomplished either by the routine scalpel techniques, electro-surgery or by using lasers. As in both laser and electrosurgery there is less bleeding and no need of suturing, these two procedures are popular in soft tissue surgical procedures and recommended in patients with bleeding disorders. Conventional scalpel technique is preferred over laser and electrosurgery, where precise incision, flap reflection and mobilization and early healing is indicated. Several surgical procedures have been implemented to treat abnormal frenum which include simple excision, Miller's technique, V-Y plasty, Z-plasty, paralleling technique, classical technique etc [11]. However, many frenectomy techiques frequently fail due to a hypertrophic scar formation and high risk of recurrence. The risk of hypertrophic scar formation can be eliminated by using a technique

known as Z-frenuloplasty/frenectomy, which is a soft tissue surgery used to lengthen a frenulum. Z plasty is an excellent procedure for both lengthening of contracted scars and/or changing the direction of scars for improved cosmetic effect[12]. This technique is indicated when there is hypertrophy of the frenum with a low insertion, in cases of a short vestibule which is associated with an inter-incisor diastema[13]. After successful frenectomy procedure and complete healing, the midline diastema is closed by composite layering technique. Direct composite resins in diastema closure cases allow dentist to achieve natural smile [14].

Case Report

A 24-year-old male patient reported to our department with chief complaint of spacing in between maxillary central incisors. The cause of midline diastema was found to be abnormal frenal attachment. Patient was systemically healthy. On intra oral examination it was found that there was a thick aberrant upper labial frenum extending into the interdental papilla between upper central incisors with short vestibule. Then the test for frenal attachment were done. Intraoral Periapical Radiograph was taken to find out the cause of diastema and to rule out the presence of any unerupted mesiodens. The diastema was created due to a wide and abnormal frenal attachment. Case was considered for Z-plasty frenectomy. The patient was explained about the treatment procedure. Blood investigations were carried out. Written informed consent was taken from the patient. Then phase 1 therapy was performed. Scaling and root planning was performed 2 to 3 days after enrolment of patient and 7 days then after. Then patient was recalled after 1 month. Surgery was performed under aseptic conditions. We began the procedure with, extraoral scrubbing with 10% betadine and asked patient to do intraoral rinsing with 2% betadine. Local anaesthesia in the form of local infiltration on both the side of frenum and nasopalatine nerve block was given. After local anaesthesia patient was asked for subjective and objective signs and symptoms. After checking subjective signs and symptoms, incision line was marked with pencil on the frenum. Then vertical incision is made on the frenum with 15 no blade. Two lateral horizontal incisions of same length (approximately 1-2 cm) were placed at the coronal and apical end of vertical incision at an angle of 60° to the vertical incision (in opposite direction), creating two triangular flaps of equal size and shape[15]. Adequate undermining of the surrounding tissues was performed to achieve proper mobilisation of the flaps. The two triangular flaps were then rotated and transposed to the opposite side of the apex of each flap. Tips of the flap was sutured with 5-0

vicryl suture. Then rest of the flap were sutured. post-operative instruction was given to patient. Patient was asked to take analgesics if required and was advised 0.2% chlorhexidine gluconate mouth-rinse twice daily for 2 weeks. patient was recalled after 7 days. Post-operative healing was accessed at 7th day, 15th day and 1month. After complete healing, patient is recalled for composite restoration. Scaling is done to remove any plaque and debris. Firstly, shade selection was considered A1 shade of Vita guide for the teeth to be restored. Proper isolation was done and cheek retractor was applied. Central incisors were retracted by using retraction cord. 37% phosphoric acid (Etching Gel) was applied on the mesial surface to be restored for 15 seconds, rinsed for 20 seconds, and dried with air slightly. Then a single bottle bonding agent was applied and polymerized for 20 seconds with a curing light. After that layer of composite were applied and cured with curing light. After complete layering of composite, polishing was done with polishing disc to convert rough surface to smooth one by using low speed handpiece. Then patient is recalled after 24 hrs for finishing which was done by finishing burs. Then patient is recalled at 1month, 3month and 6month intervals for checking the restoration, and polishing rough surfaces if any. Patient was advised to do proper oral hygiene, brushing twice a day and use of chlorhexidine mouthwash.

Discussion

The management of aberrant frenum is more important and has gained much of interest in the present era. Recent techniques, such as Z-plasty avoids scar formation and has better post-operative healing. A study by Heller et al. in 2005 compared the treatment outcome for Z-frenectomy technique and the traditional horizontal to vertical frenectomy in the management of aberrant frenum. Of 16 patients recruited in the study, 11 patients underwent a Z-plasty and 5 patients had their aberrant frenum corrected with the horizontal to vertical plasty. The frenulum length, length of tongue protrusion and speech was analyzed pre- and post-operatively. The results of the study have concluded that the, Z-plasty technique was a superior technique and has some advantages than the other, with an improvement in frenulum length and tongue protrusion of 37.5 ± 13.5 mm compared to the other method at 36.2 ± 7.6 mm respectively. In addition, it was also found that 91% of the patients with Z-plasty showed improvement in speech compared to other 40% who underwent the horizontal-to-vertical plasty. Many techniques have disadvantages of scar formation, the main advantage of the Z-plasty method over the conventional technique is minimal scar tissue formation post-

operatively. The disadvantage of Z-plasty method is its technique sensitivity[16]. Z-plasty technique improves the lip and tongue function, results in less soft tissue tension and also increases the length of lip. It is very reliable technique. The other techniques used to correct aberrant frenum such as V-Y frenuloplasty, Miller's technique, Electrosurgery and lasers, etc. In terms of aesthetic dentistry composite restoration offers numerous advantages than ceramic veneers and orthodontic treatment. Composite restoration has good longevity, can be repaired if fractured, has good bond strength with tooth, and is economic restorative material [17]. Presence of unmanaged parafunctional forces such as bruxism, Class III end-to-end occlusal schemes, or noxious oral habits such as nail biting can potentially jeopardize the longevity of direct composite resin restorations [18].

Conclusion

Z- plasty technique is mainly advocated in cases of hypertrophy of frenum with low insertion which are associated with the midline diastema and also in cases of short vestibular depth. Z-plasty technique has advantage of redistributing tension over skin, minimal or no scar formation, increases the length of lip in cases of short vestibule, showing excellent functional and esthetic results.

References

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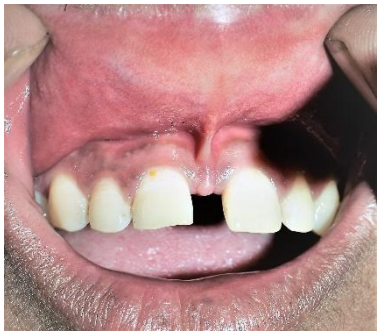
Flap approximation

Initial vertical incision

Complete suturing



Pre-op

Initial vertical incision

Z shape incisions

1 month follow up

1 month follow up

Esthetic smile after composite restoration