Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/20630
DOI URL: http://dx.doi.org/10.21474/IJAR01/20630

RESEARCH ARTICLE

"ESTHETIC REHABILITATION WITH PORCELAIN LAMINATE VENEER FOR ANTERIOR DIASTEMA WITH A HIGHLY ATTACHED MAXILLARY LABIAL FRENUM : A CASE REPORT"

Shubham R. Pal[1], Tapan Kumar Giri[2], Debabrata Biswas[3], Prakhar Bhardwaj[4], Chitra R.[1] and Sreeja Karmakar[1]

1. PGT, Department of Prosthodontics and Crown & Bridge, Dr. R. Ahmed Dental College and Hospital.
2. Principal and Professor, Department of Prosthodontics and Crown & Bridge, Dr. R. Ahmed Dental College and Hospital.
3. Professor & Head of the Department, Department of Prosthodontics and Crown & Bridge, Dr. R. Ahmed Dental College and Hospital.
4. PGT, Department of Periodontics, Dr. R. Ahmed Dental College and Hospital.

Manuscript Info

Manuscript History
Received: 18 January 2025
Final Accepted: 21 February 2025
Published: March 2025

Key words:-
Ceramic Laminate Veneers, IPS Emax, Maxillary Midline Diastema, Frenectomy

Abstract

IPS e.max is a lithium disilicate glass-ceramic known for its excellent translucency, durability, and strength, making it ideal for minimally invasive restorations. It mimics natural light refraction, ensuring superior esthetics, especially for single anterior and posterior crowns. It is a unique system that fulfills all of patient's demands for minimally invasive dentistry.A maxillary midline diastema, often associated with a highly attached labial frenum, presents an esthetic challenge. In this case, the high frenum attachment was treated with Z-plasty frenectomy technique, which resulted in excellent healing with minimal scarring. This case report highlights the successful rehabilitation of a maxillary midline diastema using IPS e.max ceramic laminate veneers, achieving optimal esthetics and patient satisfaction.

Introduction:-

The key to a successful dental case lies in accurately diagnosing the underlying etiology and crafting a meticulous treatment plan. Managing large anterior interdental spaces, particularly maxillary midline diastema,demands a well-coordinated,multidisciplinary approach to ensure both aesthetic excellence and long-term stability[1]. Soft tissues play a pivotal role in harmonizing restorations with hard tissues and the surrounding gingiva. Achieving an ideal soft tissue architect often necessitates procedures like crown lengthening and frenectomy to create a balanced and visually appealing contour. A high labial frenum attachment is a common contributing factor to midline diastema, making its precise management crucial before embarking on restorative treatment[1]. In this case, a conventional Z-plasty frenectomy was performed, followed by a well-planned healing period. Once optimal tissue adaptation was achieved, the diastema was closed with porcelain laminate veneers, restoring both function and aesthetics to perfection.

Case Report

A 36-year-old married female reported to our institute Dr. R. Ahmed dental college and hospital Kolkata in department of prosthodontics and crown and bridge, with the complaint of spacing in maxillary front region and

Corresponding Author:- Shubham R. Pal
Address:- PGT,Department of Prosthodontics and Crown & Bridge, Dr. R. Ahmed Dental College and Hospital.

unesthetic appearance. Intraoral findings presented with the highly attached thick maxillary labial frenum with diastema of more than 2 mm in the midline. Also, there was mild spacing in the maxillary lateral and canine region bilaterally. Incisors having healthy marginal gingival and no underlying pathology (Figures 1 and 2 and 3).

Figure 1:- Pre-operative view.

Figure 2:- Preoperative view (I/O).

The interdental spacings were noted. The probing depth of 2 mm was noted with no gingival recession. Radiographic examinations were done to eliminate other probable etiology. The treatment options given to the patient were orthodontic closure of space, direct restoration by composite resin, and porcelain laminate veneers (PLV). The patient opted for the Porcelain laminate veneers due to its conservative approach and short duration. Patient was scheduled for maxillary frenectomy as the frenum was highly attached which may be one of the causes of midline diastema. The diagnostic impressions were made using irreversible hydrocolloid impression material (Algingum: Prime dental product Pvt Ltd.) and poured with Type III dental stone (BNSTONE: B N CHEMICALS), and the study casts was retrieved for treatment planning. study cast was used for the diagnostic mock-up of the maxillary central incisor. However, it was later explained to the patient that restoring only the central incisor would not be aesthetically pleasing, as it would appear disproportionate compared to the other anterior teeth. To achieve a

more harmonious and proportionate appearance, the restoration of the lateral incisor also needed to be included in the treatment plan (Figure 4).After getting patient approval lateral incisors were also included in treatment plan. Shade selection was done using VITA Toothguide 3DMASTER before preparation.

Figure 3:- Shows high frenum attachment.

Figure 4:- Diagnostic wax-up.

The treatment plan was then finalized with:
1. Maxillary labial frenectomy by Z-Plasty technique.
2. Then restoring the maxillary centrals and lateral incisors bilaterally with Porcelain laminate veneer.

Informed consent was taken prior to treatment that explained the benefits, drawbacks, and complications associated with the treatment.

On next appointment Z-Plasty frenectomy technique was performed in this case, which is a periodontal plastic surgery used to remove an aberrant frenum, specifically a high labial frenum attachment, by creating two triangular flaps that are transposed and sutured, resulting in minimal scarring and improved aesthetics (Figure 5). The patient was then recalled after 2-3 week to see the postoperative healing and suture removal. After 2 months the healing was satisfactory with no patient discomfort (Figure 6).

Figure 5: Frenectomy done with z-plasty.

Figure 6:- Healed frenum after 2-3 months.

The final preparations were then started for the laminate veneers on 11,12,21 and 22 using tapered chamfer and depth cutting diamond bur. Preparation design involved the incisal overlap to end on palatal butt joint. The shade selection was done with 3D Vita master shade guide before preparation. The final impression was then made with putty and light body addition silicone impression material (Photosil:DPI) (Figure 7 and 8). Try in of the PLV were done using the try in transparent gel and was evaluated for the overall contour, size and shape, the adjacent contacts and fit, palatal smooth finish lineand any shade change with try-in gel. The patient'sapproval was taken with respect to size and shape and shade of the ceramic veneer (Figure 9).

The cementation of veneers was then started with the 11 and 12first and the 21 and 22 respectively. The adjacent teeth were isolated with mylar strips to protect from the etchant. The luting resin cement (ColteneSolocem Transparent self-adhesive dual cure resin cement) was used to cement the ceramic veneers. The excess cement was removed thoroughly around the veneers and from the gingival sulcus. The patient was satisfied with the overall aesthetics and shade of the IPS e-max PLV. (Figure 10& 11).

Figure 7:- Final impression.

Figure 8:-Final preparation view.

Figure 9:- Bisque trial.

Figure 10:-After final cementation.

Figure 10:-Post-operative view.

Discussion:-

Maxillary midline diastema, spacing in the anterior teeth aesthetic zone are common aesthetic concerns among adults. Maxillary midline diastema is common amongst most patients, so to determine the etiologic factors is crucial. [1] Various Factors included are mostly high labial frenum attachment, tooth size or shape discrepancy, congenitally missing lateral incisors. While a great majority of diastemas close after the eruption of maxillary canines, patients with diastemas greater than 2 mm and generalized spacing are at risk of not closing with normal development.[2] The pretreatment relationship between a clinically "abnormal"-appearing maxillary midline frenum and a midline diastema showed a strong, but not absolutecorrelation. A certain percentage of patients demonstrated a diastema but not an abnormal frenum or no diastema but an abnormal frenum.[2] A persistent frenum was also described as an etiologic factor for reopening of a diastema following orthodontic treatment, but the causative role of the frenum for this recurrence remains controversial.[3] Diastema, recently considered a malocclusion, has been described as a space equal to or greater than 0.5 mm interdentally and present in most cases between the anterior teeth in the maxilla more than the mandible.[4] Several treatment options employed to close the midline diastemas due to tooth-size discrepancy include direct restorations using composite resins, indirect restorations such as PLV, full contour porcelain crowns, and orthodontic treatment. This case presented with 3-4 mm of midline diastema of central incisors and spacing between lateral incisors and canine also bilaterally. which was rehabilitated with the IPS Emax porcelain laminate veneers on 11, 12, 21 and 22 with the incisal overlap design. Any abnormalities in the size and location of the frenulum can cause functional and aesthetic problems which requires surgical excision.[5] It can be performed using various surgical techniques such as the V-shaped incision and its modifications, the Z-plasty incision, and the use of lasers.[6] In this case, Z- plasty frenectomy technique has been used. Z- plasty can help to minimize scarring and improve the overall appearance of surgical area, it redistributes tension on the skin and wound, promoting better healing and minimizes scar formation.[7]In this case of Z- plasty frenectomy, a central incision was made, and two triangular flaps were created. These flaps were then transposed (switched) and sutured with 5-0 Vicryl suture material to their opposite sides, creating a “Z” shape. porcelain laminate veneers represent a more popular treatment method for many aesthetic dental problems, such as diastema closure, due to their high aesthetic properties, superior color stability, biocompatibility, documented clinical performance, and good mechanical properties than direct resin composite restoration.[8] IPS E-max remains one of the most studied and tested lithium disilicate materials in the dental industry as it combines the biocompatibility, longevity, and good aesthetic results. In this case, the treatment options given to the patient were orthodontic closure of space, direct restoration by composite resin, and porcelain laminate veneers (PLV). The patient opted for the Porcelain laminate veneers due to its conservative approach and short duration. The existing clinical situation majorly influences the type of veneer design, the existing condition of the incisal edge and its translucency, the type of extension of the restoration to be made and stress distribution expected at the veneer tooth interface. In this case the design preparation included the incisal overlap. Although Meijering[9]found no difference between coverage and no incisal coverage, greater survival rate for incisal coverage (almost 96%) was noticed by Smales[10]compared with no incisal coverage (85%).

Conclusion:-

The long-term success and survival of porcelain laminate veneers depend on several critical factors, including careful case selection, comprehensive treatment planning, precise preparation design, appropriate material selection, proper techniques, and the expertise of a skilled ceramic technician. Various treatment options, such as composite restorations, porcelain laminate veneers, full-contour porcelain crowns, and orthodontic treatment, have been explored in the literature for managing midline diastemas. Among these, Lithium Disilicate ceramic veneers emerged as the optimal choice in this case. Unlike orthodontic treatment, which requires a longer duration, and composite restorations, which are prone to discoloration over time, Lithium Disilicate veneers offer superior aesthetics, durability, and long-term stability.

Source of Funding
None.

Conflict of Interest
None.

References:-

1. Raipure, Pawar and Kharsan / International Journal of Oral Health Dentistry 2023;9(3):215–219
2. Edwards JG. The diastema, the frenum, the frenectomy: a clinical study. Am J Orthod. 1977;71(5):489–508.
3. Shashua D, Artun J. Relapse after orthodontic correction of maxillary median diastema: a follow-up evaluation of consecutive cases. Angle Orthod. 1999;69(3):257–63.
4. Morais JF, Freitas MR, deFreitas KMS, Janson G, Branco NC. Postretention stability after orthodontic closure of maxillary interincisor diastemas. J Appl Oral Sci. 2014;22(5):409–15.
5. Takei HH, Azzi RA. Periodontal plastic and esthetic surgery. In: Newman MG, Carranza FA, editors. Carranza's Clinical Periodontology. London: W.B. Saunders; 2002. p. 870–1.
6. Delli K, Livas C, Sculean A, Katsaros C, Bornstein MM. Facts and myths regarding the maxillary midline frenum and its treatment: a systematic review of the literature. Quintessence Int. 2013;44(2):177– 87.
7. Bajaj P, Shirbhate U, Subhadaresanee C, et al. Management of Aberrant Frenum by Z- plasty Procedure: A Case Report. Jan 08,2024. Cureus 16 (1);e51853.
8. Rosales AB, Carvacho DDN, Cacciutolo RS, Guineo MG, Fuentes CG. Conservative approach for the esthetic management of multiple interdental spaces: A systematic approach. J EsthetRestor Dent. 2015;27(6):344–54.
9. Meijering AC, Creugers NH, Roeters FJ, Mulder J. Survival of three types of veneer restorations in a clinical trial: A 2.5-year interim evaluation. J Dent. 1998;26(7):563–8.
10. Smales RJ, Etemadi S. Long-term survival of porcelain laminate veneers using two preparation designs: a retrospective study. Int J Prosthodont. 2004;17(3):323–6.