

Space closure in anterior segment of upper jaw by multidisciplinary approach: A case report

Sarvin Sarmadi^a, Masomeh Esmaily^b, Farhad Sobouti^c

Abstract

Patients with midline or generalized diastema can be managed successfully by multidisciplinary approach. Our patient was managed by orthodontic, prosthodontic and restorative procedures. After orthodontic treatment, maxillary labial frenectomy was done for this patient to reduce the possibility of relapse. Restorative treatments were also performed to close the remaining spaces. After all, a fixed prosthodontic bridge was constructed to close the remaining posterior space.

Keywords: Distema, Diastema closure, Orthodontic treatment

Space closure in anterior segment of the jaws, has been a major challenge in dentistry.¹ Diastema between anterior teeth or generalized spacing may be caused by several factors. These can be tooth loss or periodontal problems.²

^aAssistant professor, department of orthodontics, dental school, Tehran University of medical sciences.

^bPostgraduate student, department of orthodontics, dental school, Tehran University of medical sciences.

^cOrthodontist.

Corresponding author:

In younger patients, space closure may be done easily by orthodontic treatment alone. This can be achieved by prosthodontics methods such as porcelain fused to metal (PFM) crowns which generally lead to satisfactory results considering functional and esthetic demands.³ Using these methods necessitates removing large amounts of the tooth structure which is a major disadvantage. Recently, laminate veneers have become popular for closing diastema in anterior parts of the mouth. Although this method is less aggressive than other alternatives, it requires unnecessary coverage of all the facial surfaces of involved teeth. It has also other complications such as color disharmony and soft tissue irritation in the gingival margins.¹ Any of the above methods has advantages and at the same time problems which limit their application in space closure.

A composite veneer in proximal surfaces of anterior teeth is another practical and conservative way.^{1, 3, 4} It may be less durable than PFM crowns but still it has some advantages such as:

1-Preservation of tooth structure, 2-Low cost, and 3-Less time needed for the treatment,

The possibility of repeating the treatment or changing the shape and contour if necessary, On the other hand, many patients can be managed by combined orthodontic-restorative procedures.

Diastema between maxillary central incisors may be increased due to the presence of labial frenum in alveolar bone and its extension downwards. In this case a band of fibrotic tissue is present between central incisors, so it is necessary to reposition or eliminate the frenum by surgery. This operation should be performed in coordination with orthodontic treatment to produce acceptable esthetic results. If the space is relatively small, it is possible to close the space by moving the teeth towards midline. If the space is large and frenum is thick, it would not be possible to close the space completely before frenectomy.^{5,6}

The major etiologic factors resulting in tooth spacing are as follows:

- Prominent labial frenum^{5,6}
- Congenitally missing teeth
- Malformed teeth such as peg shaped laterals⁷
- Tooth size, jaw size discrepancy (Bolton)

Case report

A 39-year old female patient was referred from department of restorative dentistry, dental school of Tehran university of medical sciences. Her chief complaint was large spaces between central incisors of upper jaw and unaesthetic shape and color of her front teeth. (Figure 1, 2) The patient did not have any medical problem or systemic diseases. After primary evaluation in the restorative department, her dental history was shown to be:



Figure 1: Large spacing between centrals of upper jaw



Figure 2: Unaesthetic shape and color of the front teeth

Extraction of upper right first premolar and upper left second premolar, Endodontic treatment of upper left canine, Amalgam/composite restorations of upper left first and second molars and upper right incisors, canine and first and second molars. (Figure 3)

The patient was referred to orthodontic department to close the space between upper central incisors and divide the remaining space between mesial and distal surfaces of

upper lateral incisors in order to do the final restorative treatment.



Figure 3: Occlusal view of spacing between maxillary teeth

The final treatment plan was based on composite veneer of the lateral incisors and maxillary labial frenectomy and closing the remaining posterior spaces by fixed prosthetic bridges.

The patient was admitted and examined in orthodontic department as a multidisciplinary case. Study casts were prepared. Lateral cephalometry and panoramic radiograph were ordered. (Figure 4)



Figure 4: Panoramic view

According to the data from the above sources, her profile was diagnosed to be convex and dental midline shift in upper jaw was present (1.5 mm to the left). Old restorations were all discolored. Around 3mm diastema was present between central incisors of upper jaw. Some part of this space could be attributed to loss of posterior teeth and some was related to her high labial frenum and the rest of it was due to Bolton discrepancy.

Molar and canine relationships were Class II in the right side while in the left side canine relation was Class I. Molar relation in the right side could not be evaluated due to the loss of first molar. Overbite was recorded to be 3.5 and there was 1mm overjet present. Anterior Bolton discrepancy 8 of 75% was also observed which shows 2 mm of excess in the size of lateral incisors in mandible. She was mild skeletal class II and short face. Upper anterior teeth were slightly retruded and there was protrusion of lower anterior teeth. Orthodontic treatment plan is discussed below:

- Consulting with endodontics department regarding retreating upper left canine.
- Consulting with periodontics department considering labial frenectomy after orthodontic treatment.
- Evaluating the possibility of composite veneering for upper anterior teeth from right canine to the left one.
- Banding and bonding of maxillary teeth with 0.022" slot metal brackets and bands (MBT, 3M, USA) and Transbond XT light cure adhesive (3M, Unitek, USA).
- Alignment and leveling of maxillary teeth.
- Midline correction in upper jaw.
- Closing the central diastema.
- Space distribution in mesial and distal surfaces of upper lateral incisors.
- Finishing

Orthodontic treatment took 8 months (Figure 5 and 6) and the patient was referred to periodontics department for maxillary frenectomy. Then, fixed retainer was used before beginning the restorative treatment. Fixed retainer was constructed with 0.175" twisted stainless steel wire (Dentaurum, Germany) and bonded with Transbond XT light cure adhesive (3M, Unitek, USA). The patient was referred

to restorative department for composite buildup of upper lateral incisors.



Figure 5: Patient under orthodontic treatment



Figure 6: Occlusal view of the upper jaw under orthodontic treatment

Composite build up was done for maxillary laterals in order to get the best results with lower cost and preservation of tooth structure. A fixed prosthodontic bridge was constructed for maxillary canine to second premolar for both sides. Old and discolored restorations were also replaced. (Figure 7, 8) Fixed retainer was placed for the patient from left to the right canine again with the

same procedure that was mentioned. (Figure 9)

The aim of this case report was to show closing the space between maxillary anterior teeth in an adult patient by multidisciplinary approach with low cost and in a short time.



Figure 7: Patient's smile after finishing treatment



Figure 8: Final view after maxillary treatment



Figure 9: Fixed lingual retainer

References

- 1-Heymann HO, Hershey HG. Use of composite resin for restorative and orthodontic correction of anterior interdental spacing. *The journal of prosthetic dentistry* 1985; 53:766-71.
- 2-Pinho T, Neves M, Alves C. Multidisciplinary management including periodontics, orthodontics, implants and prosthetics for an adult. *Am J Orthod Dentofacial Orthop* 2012;142:235-45.
- 3-Goldstein, R. *Esthetics in Dentistry*, second edition, B.C. Decker Inc.: Hamilton, Ontario, Canada 2002.
- 4-Jepson NJ, Nohl FS, Carter NE, Gillgrass TJ, Meechan JG, Hobson RS et al. The interdisciplinary management of hypodontia: restorative dentistry. *British Dental Journal* 2003; 194: 299-304.
- 5-Edwards JG. Soft tissue surgery to alleviate orthodontic relapse. *Dent Clin North Am* 1993; 37:205-25.
- 6-Shashua D, Artun J. Relapse after orthodontic correction of maxillary median diastema: A follow up evaluation of consecutive cases. *The Angle Orthod* 1999;69(3):257-63.
- 7-Ittipuriphat I, Leevailoj C. Anterior space management: Interdisciplinary concepts. *J Esthet Restor Dent* 2013;25:16-30.
- 8-Rakosi T, Jonas I, Graber TM. *Color atlas of dental medicine: Orthodontic-Diagnosis*. 1993;Thiem medical publishers. Germany. Page 228.