

Aesthetic Management Of Generalized Spacing In Maxillary Arch: A Case Report

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Abstract

Interdental spaces and lack of contact points between teeth are characteristic features of teeth spacing. Localized spacing is the term used when two to six teeth are involved. The aim of this study is to describe the visible changes that occurred in the oral cavity and indicate the possible treatment methods for the case. Localized spacing is due to several local factors which include small teeth, large arch length and periodontal disease.

This case report discusses the aesthetic management of a young Egyptian male complaining of bad anterior aesthetics and the inability to talk or smile confidentially and therefore leading to a decrease in his confidence and psychological health.

Thorough patient assessment were followed by impression taking a diagnostic wax-up and an intra-oral motivational mockup for aesthetic biological and functional verification. Upon the patient's agreement on the treatment fixed restorations using mockup guided preparation technique were carried out.

The laminate veneers closed the spaces with the natural appearance the patient desired and he was satisfied with the outcome. The function and occlusion of the restoration were good and provided optimal results in phonetics and gingival health. It also prevented food impaction in contrary to the initial condition. The veneers and the periodontal tissues were in a good condition at the one-year recall

The laminate veneers restored the maxillary anterior localized spacing and provided an excellent esthetic outcome as well as being a minimally invasive treatment that requires less time and immediate results.

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1- Introduction

One of the most common esthetic problems faced by the patient during dental visits is anterior spacing. Tooth size and arch length are the main etiological causes for tooth spacing¹. Maxillary lateral incisors vary in form more than any other tooth in the mouth. Microdontia is a condition where the teeth are smaller than the normal size. Localized microdontia of maxillary lateral incisor is called as “peg lateral”, that exhibit converging mesial and distal surfaces of crown forming a cone like shape, which is visible in this case².

The presence of spacing in the oral cavity causes both medical and psychological drawbacks to the patient. The lack of contact points present between adjacent teeth leads to the development of gingivitis; causing the decreased formation of an attractive smile³.

Enhancement of aesthetics of anterior teeth is a challenging procedure. The patient may present with teeth which may be discolored, attrited, fractured, malaligned or has an open space between the teeth. These open spacing or malalignment of teeth are due to tooth material and jaw size discrepancy as mentioned above. They can be corrected by using three different treatment modalities and they are by orthodontic treatment as a first option but sometimes it is not possible due to some limitations, such as time and cost. However in this case it was also refused by the patient. The remaining two modalities for restoring the spacing in anterior teeth can be by placement direct composite veneers with indirect porcelain laminate veneers. Due to the large amount of spacing between the teeth, direct composite restorations were contraindicated.

Restoring the spacing with porcelain laminate veneers using minimally invasive technique was the treatment of choice, as it is the most conservative and aesthetic approach⁴. They have the advantage of having superior aesthetics; giving the restoration a life like appearance and a natural smile, as well as providing longevity and marginal adaptation. The last option would have been full coverage which was not needed in this case.

2- Case description and results

This case report has been described according to the 2013 CARE checklist for case report writing and publishing guidelines.

2-1. Patient Information

A 22-year-old male waiter showed up in the

conservative department dental clinic in Cairo University, complaining about the bad appearance of his smile. Upon investigation, we found that he lived in a rural area of Egypt but worked in one of the elite cities of Cairo. The appearance of his smile was negatively affecting his self-esteem when dealing with his customers and he needed a rapid solution for his problem. He never visited the dentist and maintained poor oral hygiene.

2-2. Diagnosis and Assessment

Clinical diagnosis showed that the patient had generalized spacing from the upper left canine to the upper right canine, with excessively large midline spacing between the upper central incisors.

The patient had no carious lesions in the oral cavity.

The only abnormal finding in the oral cavity was the patient had congenitally missing lower central incisors and located in the space were remnants of a tooth. Upon gathering information from the patient, the patient stated that the remnant appears again after it has been extracted and refused to extract it for a second time. (fig 1)



Fig 1 A pre-operative photo showing multiple spacing and remnant of tooth located instead of lower central incisors

2-3 Therapeutic intervention

Patient education covering proper oral hygiene measures were done. The treatment options discussed with the patient were orthodontic treatment or laminate veneers. The patient refused the lengthy procedure of orthodontics as well as the bracket appearance during treatment.

Primary impressions were taken with heavy and light condensation silicone impression material (Zhermack, zetaplus, poland) and a wax up followed by a temporary motivational mock-up were done for biological, functional and aesthetic assessment (fig 2).

The restorative treatment plan was discussed with the patient and we decided to go for lithium disilicate veneers in teeth number 13,12,11,21,22,23. An informed consent for this treatment was obtained before any intervention was made.

Depth grooves were done on the labial surface of the teeth over the existing mockup with depth cutter stones of size (0.5 and 0.3) the 0.3 depth cutter stone was used on the cervical plane of the tooth and the 0.5 was used on the middle and incisal plane due to enamel thickness increasing as we go down incisally and we needed to stay in fresh enamel for optimal bonding and longevity of our restoration. 0.5 incisal grooves were also done, then the grooves were marked using graphite to be used as a guide to our preparation. I want to note that the depth cut was taken above the existing mockup so that we remove only necessary tooth structure guided by the mockup the preparation was done using veneers preparation kit.

After applying the retraction cord in the sulcus using the size 000 respectively Secondary Impression was taken for the upper arch using putty and light addition silicone impression material (zermack , hydrorize , poland) and the shade was chosen (fig 3) then the impressions were sent to the lab and a cast was poured with gingival simulation to fabricate our crown and veneers

Then we received our try in restorations (lithium disilicate or press emax) and asked some slight adjustments and sent it back to the lab for the final restorations (fig 4 a and b), we began the cementation phase with multiple isolation technique of the upper arch with the use of dentsply medium thickness rubber dam, unwaxed oral B dental floss and B4 clamps, isolation of the preparations that were not being cemented were covered by teflon (fig 5a) , the fitting surfaces of our restorations were conditioned using 9% hydrofluoric acid (ultradent,germany) for 20 seconds followed by application of silane coupling agent (bisco,z-prime,usa), then the tooth was conditioned by the application of phosphoric acid 37%(ultradent,germany) for 15 seconds (fig 5b) followed by application of bonding agent (fig 5c) (bisco, all bond,usa), then we used transparent light cured resin cement (pentron, mojo , clear,usa) to cement our restorations and light cured the veneers. Cementation of the veneers was carried out by cementing the tooth and its contralateral at the same time so we started with 11 and 21 followed by 12 and 22 then 13, 23. (fig 5d)

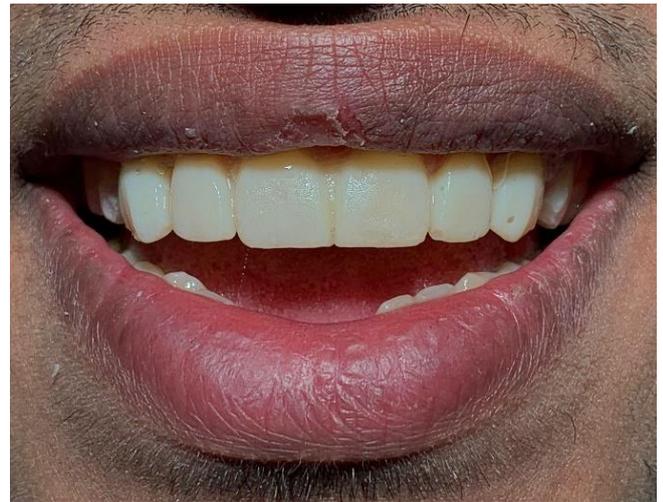


Fig 2
Mock up of anterior teeth

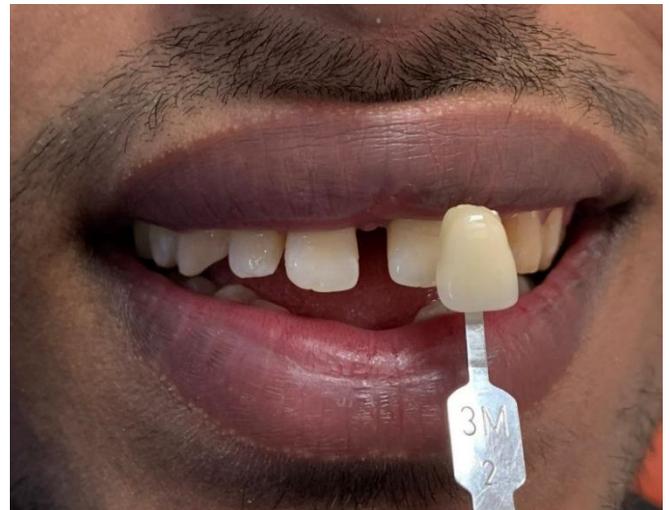


Fig 3 Shade Selection

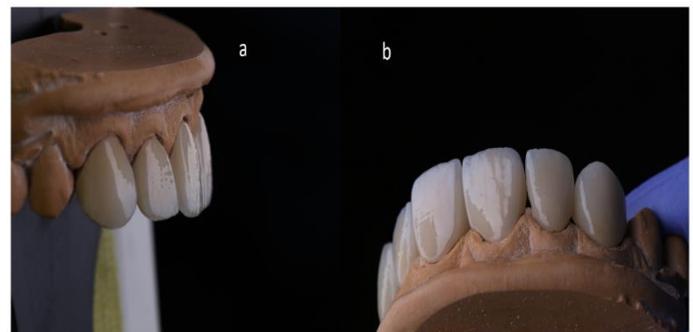


Fig 4: Final Restoration
A- Right lateral view of final restorations on study cast
B- View of final restorations from upper right canine until upper left canine on study cast

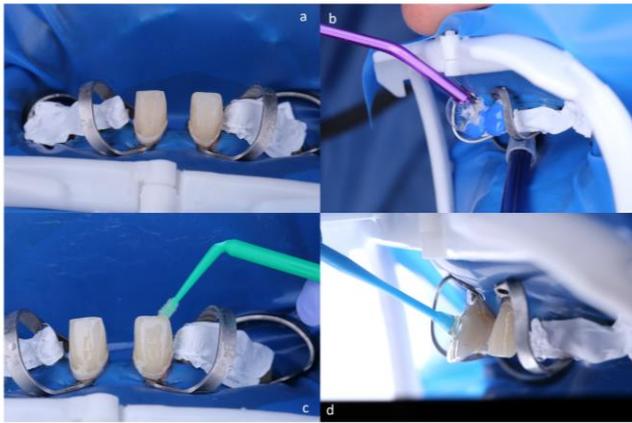


Fig. 5: Operative Photos

- A- Isolation of the preparations
- B- Rinsing of the acid etchant off the preparation
- C- Application of bonding agent
- D- Cementation of the upper right central incisor

2-4. Patient Perceptive

Directly after cementation the patient was handed a mirror and showed high satisfaction of the final results (fig 6 a-d)

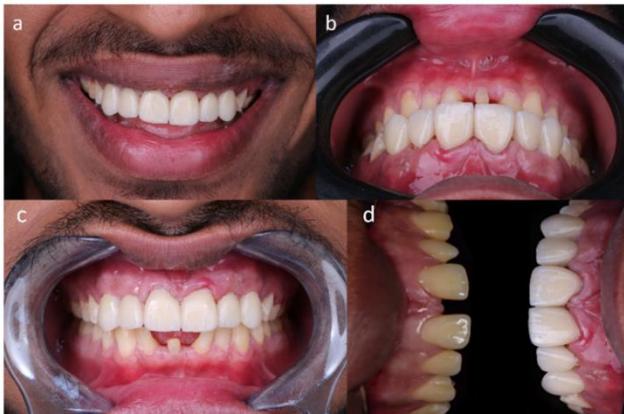


Fig. 6: Immediately Post Cementation

- A- Frontal view of patient's natural smile
- B- Retracted view post cementation from 12 o'clock view
- C- Frontal retracted view post cementation
- D- Comparison between preoperative and immediately post cementation

2-5 Follow up and outcomes

Directly after cementation, we had black triangles about 1mm high and evidence of inflamed gingival tissue. A year later we called the patient in and noted no complaints or complications but we stressed on the importance of oral hygiene measures. According to VAS (Visual Analogue Scale) the patient scored one. He was satisfied, however had slight pain due to the gingival irritation. Follow up VAS record was taken again after one year and the patient scored zero with no pain at all. (fig 7 a-c)



Fig. 7: Follow up after 1 year

- A- Frontal retracted follow up photo
- B- Patient's natural smile from 12 o'clock view
- C- Frontal view of patient during full smile

3- Discussion

Dental aesthetics can significantly affect the well-being of adolescents and young adults, influencing factors such as body representation and self-esteem⁵. Re-establishing a patient's lost natural dental esthetics is one of the most important topics and goals of today's dental field alongside speech and function⁶. Abnormalities of teeth including and not limited to structural and positional abnormalities cause esthetic problems for patients. Previously crowns were preferred to restore the teeth however due to the advancements in dentistry and the change in philosophy where conservatism is the main goal, orthodontic appliances and laminate veneers whether direct or indirect have been the preferred treatment option in order to solve such problems⁷.

Our 22 year old patient suffered from subpar aesthetics of his upper anterior teeth due to generalized spacing that affected him in both esthetics and psychological manners to the point that he developed a habit of not smiling at all and trying to hide his upper teeth with his hand while talking so we had to find a long-lasting solution for this problem. There are multiple methods for treating dental spacing orthodontic treatment, direct and indirect veneers, and lastly crowns and bridges⁸. Each treatment modality has both its indications and contraindications and they are further subdivided according to minimally invasive treatment options. In this case the patient refused orthodontic treatment as an option due to the long follow-up period. Although direct composite restorations are the second most conservative approach for this case and contain multiple benefits by being more conservative, and completing the treatment in a single visit with good initial esthetic however they are also more prone to discoloration and wear⁹ in this case however they were contraindicated

due to the large spacing between the central incisors. Therefore the third treatment modality was used, which was the usage of indirect laminate veneers.

With a 94-96% success rate as an esthetic restoration, laminate veneers are now considered the treatment of choice in cases where minimal tooth preparation is indicated¹⁰. With the advancements in dentistry, the fabrication of indirect veneers are ultra thin and offer superior aesthetic, greater life span and maximum strength¹¹.

The tooth preparation was performed according to the standard principles for indirect ceramic veneer tooth preparation. The facial surface was prepared in the three planes to give the effect of illusion to improve the aesthetic appearance. The facial surface was prepared with uniform preparation depth of 1.5 mm. The chamfer margin was placed subgingivally to improve aesthetic and emergence profile of the tooth. Preparation was finished with yellow colour fine grit finishing diamond stone. Gingival retraction was performed using retraction cord to allow visualization of the subgingival preparation. Impression were made using addition silicon impression material with double mix double impression technique and poured with die stone. The separating medium supplied by the manufacturer was applied to the prepared tooth surface. The spacer was then applied on the die to create the cementing space. Shade selection was performed using the shade guide supplied with material kit by the manufacturer. Gingival retraction was again performed for cementation procedure using retraction cords. Fluid control was performed using rubber dam to ensure moisture free environment at the cementation surface. Etching was conducted and bonding agents were applied. Before cementing the restoration, the toileting of the preparation surface was conducted. Cementation was carried out by using the resin cement of appropriate shade to prevent alteration to the shade of the veneer.

Post-cementation instructions were given to the patient which were:

- The gum tissue around the cemented tooth may be sore for several days so you may need to rinse your mouth with warm salt water
- Do not chew hard or sticky foods for 24 hours from the time the veneer is cemented as these may crack your dental restorations
- Do not floss around the restoration the day of cementation.
- Hot and cold sensitivity may occur for a few weeks and occasionally may last for several months.

- Proper brushing, flossing, and regular cleanings are necessary to maintain the final restoration.

We followed up with the patient for 12 months and noted no complaints or any other problems (fig 8).

To maintain the idea of conservatism all the upper anteriors were restored using partial coverage veneers¹².



Fig 8: Comparison between preoperative photo and follow up after one year

4- Summary and Conclusion

- The use of indirect restorations proved highly successful aesthetically and reliable outcome on the long run
- The mockup guided minimal invasive preparation technique is a conservative easy and reliable technique

Authors' Contributions

AG managed the conceptualization, Methodology, and Writing the Original draft . TA, DA managed the writing – review and editing

Informed Consent

The authors acknowledge the patient who provided written informed consent to allow this case report to be published along with the accompanying images.

Conflict of interest

The authors report no conflicts of interest in this work

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