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Case Report

Treatment of multiple diastemas in maxillary anterior teeth with indirect veneers: A case report

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ABSTRACT

Background: *Multiple diastema is one of the most frequently encountered aesthetic problems related to patient confidence. This problem is still a challenge for the clinician to restore the gap between the teeth as desired by the patient. Indirect veneers have been approved as one of the treatment plans to deal with this aesthetic problem.* ***Purpose:*** *This case report aims to describe the management of multiple diastemas in maxillary anterior teeth with indirect veneer restorations.* ***Case:*** *A 20-year-old woman came to RSKGM Universitas Airlangga with the main complaint of a gap between her upper front teeth. The patient was then explained about all the treatment options and agreed to a treatment plan for the indirect veneers restoration.* ***Case Management:*** *Treatment was carried out in 5 visits involving 6 maxillary anterior teeth. The teeth were vital and there was no discoloration. Post-treatment control was carried out one week after insertion. One of the advantages of bonded porcelain veneers is the minimally invasive treatment. Only 0.5 mm reduction was required on the incisal and labial surfaces.* ***Conclusion:*** *Indirect veneer restoration with minimally invasive techniques can provide good results in treating multiple diastema in the maxilla.*

Keyword: *multiple diastema; indirect veneers; dental esthetic*

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INTRODUCTION

Multiple diastema of anterior teeth is a condition of malocclusion that can interfere with a person's appearance and self-confidence. The etiology of multiple diastema can vary, ranging from dental malformations, agency, macroglossia, genetics, and bad habits[1]. Treatment in this aesthetic case can involve multidisciplinary science[2]. One of the many treatment options is using ceramics laminate veneer[3]. The choice of treatment with ceramics laminate veneer is based on good esthetic properties, color stability, biocompatibility, and mechanical properties[2]. Various ceramic materials have been introduced, such as lithium disilicate and zirconium oxide. In this case report the choice of treatment to close the diastema is using veneers with lithium disilicate material.

CASE

A 20-year-old female patient came to Airlangga University Oral and Dental Hospital complaining that she wanted to improve her appearance because her front teeth had gaps that made the patient feel insecure if she smiled, these teeth had never been treated before. No systemic history. On objective examination, diastema was found on teeth 13,12, 11, 21, 22, 23 and uneven white spots. The EPT test on control tooth 21 reacted at no.4, tooth 11 reacted at no.4. Examination of saliva hydration 23 seconds, viscosity watery, pH 7.6 , quantity 6 ml, buffer capacity 12. Clinical diagnosis was normal pulp. The treatment plan that will be carried out is indirect dental veneers 11 with lithium disilicate material.

CASE MANAGEMENT

Treatment of patients is carried out in several visits. On the first visit the patient underwent DHE-KIE, then informed consent and informed consent were given. After being given an explanation, do documentation of the case and print out the study model (Figure 1). During the clinical examination, the facial aspects, the smile harmony, the gingival contour, and the dental characteristics were evaluated, for initial digital smile design planning (Figure 2). Then, shade taking and lab communication (A-D shade, ivoclar) were carried

out. On the second visit, the previously printed study model was waxed up and then printed using polyvinyl siloxane and a mock-up was carried out with bis-acryl composite resin (Figure 3). Adjustment of the patient was carried out with articulating paper where the patient was instructed for central occlusion and lateral movement of the mandible. After that, try to install the mock-up before doing the preparation.

At the third visit 1 week later, veneer preparation was carried out. Isolate the work area with a rubber dam followed by tooth preparation. Make a depth cut marker on the labial with a depth cutting bur as deep as 0.5 mm, incisal reduction of 0.5 mm with a butt joint margin. Supragingival chamfer margin preparation at cervical and proximal. After the preparation is complete, the thickness of the restoration is checked with a silicon key, followed by the printing procedure. Installing the retraction cord and printing the working model with polyvinyl siloxane material using the double impression technique (Figure 4a-c). Printing antagonist with irreversible hydrocolloid.

Figure 1. (a) Looks of labial, b) Smile photo, (c) Occlusal view.

Figure 2. Digital smile design.

Figure 3. (a) Shade Taking, (b) Model Wax up, (c) Direct Mockup.

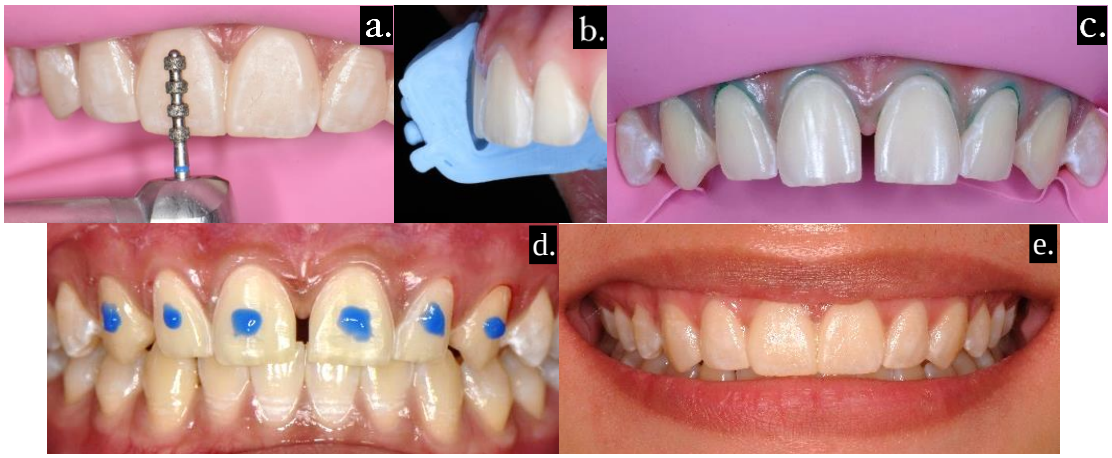

Figure 4. (a) Depth cutting bur, (b) Silicon Key, (c) Retraction cord, (d) Spot etch Technique, (e) Temporary Veneer.

Then, bite registration was made using polyvinyl siloxane, and temporary veneers were made with bis-acrylic resin using the spot etch technique (Figure 4d and 4e).

At the fourth visit 1 week later, the patient underwent anamnesis and extra-oral and intra-oral examinations. The patient has no complaints and the condition of the temporary veneers is still in good condition. The temporary veneers were then dismantled and a try-in paste (variolink) was carried out to try the Emax veneer (lithium disilicate) (Figure 5a). At the time of try on, checks were carried out which included color, margin adaptation, proximal contact and occlusion. Then isolate the work area with a rubber dam. Surface treatment was carried out on veneers of emax (lithium disilicate) by application of 9% hydrofluoric acid for 20 seconds, rinsed and dried (Figure 5b). Silane was applied to the inner surface of the veneer for 60 seconds (Figure 5c). After that, surface treatment is carried out on the teeth to be restored. Apply 37% phosphoric acid etching all over the enamel surface for 30 seconds, then rinse with water and then dry (Figure 5d). Then the bonding application with a microbrush and in the light for 20 seconds (Figure 5e). Emax veneer cementation used light cured resin cement (variolink Esthetic LC, Ivoclar Vivadent, Australia) (Figure 5f) and (Figure 5g). The remaining cement is cleaned and irradiated from all directions. The rubber dam was removed and then checked for color conformity, margin adaptation, proximal contact, and occlusion. Patients were instructed to control 1 week later.

On the fifth visit, 1 week later the patient came back for control (Figure 6.). From the anamnesis it was known that the patient had no complaints, there were no abnormalities on the extra-oral examination, the intra-oral examination of the veneers was in good condition, the color was stable, and the gingiva was normal.

DISCUSSION

Diastema in the maxillary teeth is an esthetic problem that occurs with a more frequent prevalence in the maxilla than

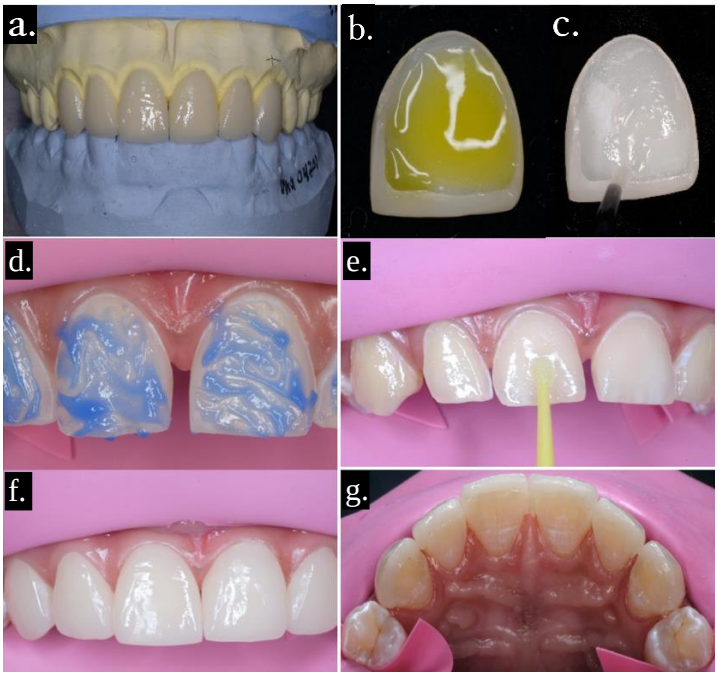

Figure 5. (a) Emax veneers on models, (b) Surface treatment hydrofluoric acid 9%, (c) Silane application, (d) Phosphoric acid application, (e) Bonding application, (f) Cementation Veneers (labial), (g) Veneer Cementation (Palatal).

Figure 6. Control 1 week post insertion.

the mandible[4]. Dental diastema is often associated with esthetic problems and malocclusion. The analysis conducted by Cousineau et al found that the prevalence of diastema in women is higher than in men with the highest age range being in the age range of 12-19 years[5]. Diastema in the permanent dentition phase has a multifactorial etiology[6]. Several etiologies associated with the occurrence of midline diastema include mesiodens, high frenulum attachment, small lateral incisor size or agency, and bad habits[7]. Effective treatment of diastema requires correct diagnosis, medical and dental history, radiographic, clinical, and calculation of the size of the dentition[8].

In this case report, before the patient is treated, a Digital Smile Design (DSD) and mock-up is made. DSD is a multifunctional clinical practical tool with its advantages such as the ability to strengthen diagnosis for aesthetics, improve communication between clinicians and laboratories, can predict each phase of treatment, increase patient knowledge and motivation, and provide effectiveness in presenting cases to patients[9]. Even though DSD provides many advantages, mock-up stages are still needed as an objective and efficient medium in communicating treatment plans. Mock-ups can also serve as a tool to confirm results from digital devices[10].

Treatment of diastema can be done by orthodontic treatment, restorative treatment, surgical correction, or a multidisciplinary approach depending on the etiology[7]. Both direct and indirect adhesive restorations are safe, predictable, and recommended restorations for closing diastema[2]. Ceramic veneer restoration is a popular treatment method for aesthetic dental cases, for example closing diastema because of its aesthetic properties, good color stability, biocompatibility, and better mechanical properties than composite resins[3]. The long-term success of veneers is highly dependent on good case selection and treatment planning, such as shade selection, tooth preparation, cementation techniques, and patient cooperation[11]. Various ceramics have been introduced, such as lithium disilicate and zirconium oxide. Lithium disilicate is a glass ceramic with a high ceramic crystal concentration of 70%12. The unique microstructure of lithium disilicate ceramics is key to their mechanical and optical properties[3].

Liebermann et al observed lithium disilicate full veneer restorations for 8 years showing a 100% survival rate with a 12.5% complication rate such as minor chipping due to trauma. There was no debonding, discoloration and secondary caries[13]. Malchiodi et al obtained a lithium disilicate survival rate of 98.7% in 3 years of observation[12]. Aslan et al under observation for 10 years stated that 85.5% of the material was found to be plaque-free, there was no significant change in the color and surface of the veneers, no fractured teeth were found. 1.64% had mechanical failure with 1.09% debonding and 0.55% fracture. Observations for 10 years resulted in a survival rate of 97.4% and a success rate of 76.3%[14]. The choice of material for this case uses lithium disilicate material not only because of its mechanical properties but also its good optical properties because it is in the anterior region. In control 1 week after insertion the patient had no complaints. And clinically the veneers are in good condition, the color is stable, and the gingiva is normal.

The presence of clefts or diastema in adult patients is a common esthetic problem. Determination of the diagnosis, etiology, and a good treatment plan can determine the success and prognosis of treatment. In carrying out minimally invasive treatments, the selection of lithium disilicate material can be considered, especially in the aesthetic zone. Lithium disilicate is the perfect material for long term success both aesthetically and functionally.

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