INDONESIAN JOURNAL OF PROSTHODONTICS

CASE REPORT

Complex aesthetic rehabilitation with lithium disilicate veneers

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Keywords: Cosmetic dentistry, Indirect veneer, Lithium disilicate, Peg-shaped, Primary tooth

ABSTRACT

Currently, demand on society for dental aesthetics has become increase especially dental veneer. Minimal invasive technique is the most advantageous technique in dental veneer due to pulp tissue remained safe and aesthetic aspect fulfilled. In this case is to give detail of aesthetic procedure to correct irregularities anatomical of the teeth using lithium disilicate veneers. A 20-year-old female patient came with a complaint of multiple diastema on anterior upper teeth. Based on objective examination 12 and 22 having peg-shaped and 53 maintain prolonged retention, agenesis and still sufficient. Multiple diastema between 53, 12, 11, 21, 22 and 23. Crown lengthening was performed on 53 to improve inciso-gingival ratio and tooth preparation for this case were using minimal invasive. Six units of lithium disilicate indirect veneer were placed using resin cement. Indirect veneers are placed with overjet and overbite are 3 mm, there is no changing contact maxillary and mandibular prior and following placement indirect veneers. Minimal invasive preparation involves in making the space needed for the restorative material of choice, outlining requirements for aesthetic needs, and outlining requirements that will make fabrication easier and created satisfactory result. After 2 months follow-up, veneers still retained well and stable, the veneers colour resembles natural teeth, tissue adaptation was also performed good and the patient is satisfied with the treatment results. Lithium disilicate veneers can be used as a treatment option for anterior teeth with deformities and primary tooth which still sufficient was performed. (IJP 2025;6(1):15-20)

Introduction

One of the biggest challenges in aesthetic dentistry is the restoration of anterior teeth. This is one of the most important topics in dentistry. To overcome aesthetic problems such as colour, structural abnormalities, and anterior tooth abnormalities, the technique most often chosen is to cover the tooth with a dental crown that covers part of the teeth. The main disadvantages of full-coverage dental crowns are excessive loss of healthy tooth structure and damage to the surrounding soft tissue. The goal of every procedure in dentistry is to provide successful dental treatment with a conservative approach and good aesthetics. Therefore, the use of veneers has increased in recent years due to their better aesthetics and minimal invasiveness.[1]

In recent years, lithium disilicate veneers have been used in dentistry as a more conservative and aesthetic treatment option. Lithium disilicate veneers are minimally invasive because they require very little tooth reduction. This veneer has promising aesthetic results because its properties are similar to enamel. Lithium disilicate material produces the thinnest veneers and has better properties than other materials.[1,2]

Lithium disilicate veneers are also known as "contact lenses", and are capable of providing a very accurate reproduction of natural teeth with good colour stability and also a very conservative treatment approach. Research has shown success rates for over 10 years for veneers. Veneers are also biologically compatible with the periodontium.[3]

This case report aims to explain the management of multiple diastema on upper anterior teeth starting from treatment planning to Lithium disilicate veneer cementation to restore aesthetics and function.

Case Report

A 20-year-old woman came to the RSGM Prof. Soedomo UGM with a complaint of poor shape appearance and gaps on her upper jaw front teeth. The patient came of his own will to improve the condition of his teeth which caused her to lack confidence. The patient admitted that he had never worn dentures before. The patient admitted that he had no history of systemic disease. The patient has no history of allergies, medications, or foods. The patient is not under a doctor's care or taking routine medication.

The results of the extraoral examination showed that there were no abnormalities in the patient's lips, lip and cheek muscles, and lymph nodes figure 1. Intraoral examination showed multiple diastemas between teeth 53, 12, 11, 21, 22 and 23. Teeth 12 and 22 were peg-shaped and tooth 53 had not fallen out and was in good condition. Figure 2.

On radiological examination, it was seen that the alveolar-crest furcation and periapical conditions were within normal

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DOI 10.46934/ijp.v6i1.282

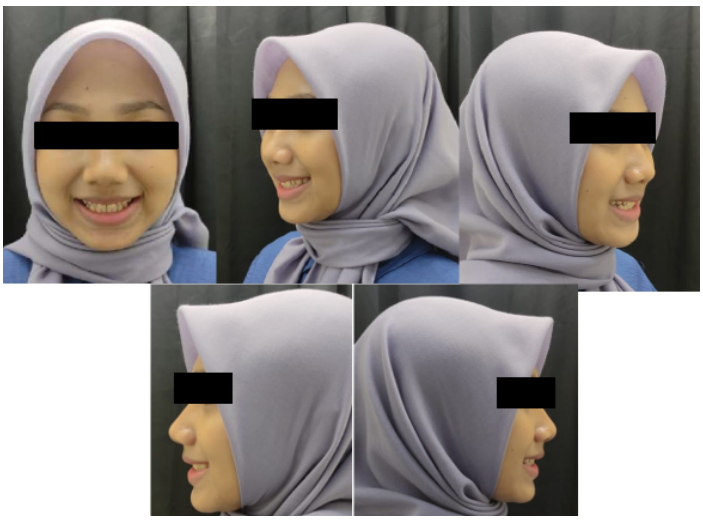

Figure 1. **Extraoral photo of patient**

Figure 2. **Clinical photo of the patient before treatment**

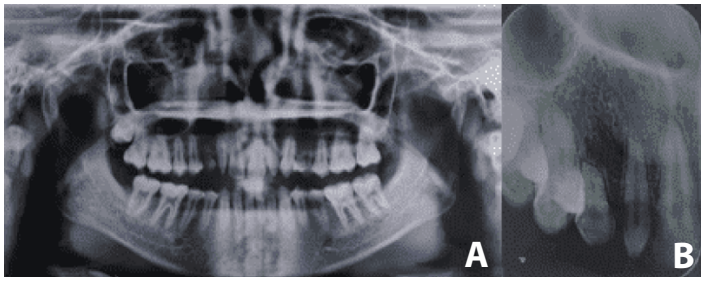

Figure 3. **A. Panoramic radiological image, B. Periapical radiological image**

Figure 4. **Measurements before crown lengthening procedures**

limits, and absent of complement of tooth 53. Then a periapical radiology was performed, which confirmed the previous radiology that tooth 52 persisted in the condition of root resorption figure 3.

The patient was diagnosed with Anterior Maxilla Diastemata (peg-shaped on teeth 12 and 22). The patient was given the option of veneer due to its minimally invasive nature and excellent aesthetic qualities, so the decision was made to enhance the appearance using lithium disilicate veneers.

The overall treatment plan is indirect veneers on teeth 12, 11, 21, 22, and 23, crown lengthening on tooth 53 by 1 mm, and direct veneers on tooth 53. Crown lengthening is carried out on tooth 53 to improve the inciso-gingival ratio and tooth preparation, in this case using minimally invasive. Then, we made the impression of the maxilla and mandibula using irreversible hydrocolloid, and the cast was poured using type 3 gypsum.

At the next appointment, crown lengthening was carried out on tooth 53 after anaesthesia using 0.5 cc of lidocaine and epinephrine. Gingival excision is carried out using blade number 15. Then, irrigation and dressing are carried out with a gingival pack. figure 5 The patient was instructed to avoid brushing in the wound area, playing with the tongue, and eating hot foods for 3 days. Patients are prescribed antibiotics, analgesics, and anti-inflammatory drugs. The patient's teeth are matched with the shade guide and produce colour A2 figure 6.

At the third appointment, control of crown lengthening and veneer preparation is carried out figure 7 and figure 8. After that, we made the working with elastomeric impression material and one step technique figure 9. Then, a temporary crown is made figure 10.

The fourth meeting carried out a try-in of veneer and insertion figure 11. During the try-in, adaptation, occlusion, colour, and aesthetics of the veneer are checked. Six units of indirect lithium disilicate veneer were cemented using resin. ement. Indirect veneers were inserted with an overjet and overbite of 3 mm each, there was no change in the contact of the maxilla and mandible before and after the insertion of the indirect veneers. To remove excess of cement resin in interproximal was using dental floss.

After 2 months of follow-up, the veneers were still good and stable, the veneer colour resembled natural teeth, tissue adaptation was also going well and the patient was satisfied with the treatment results. Lithium disilicate veneers can be used as a treatment option for anterior teeth that are deformed and primary teeth that still require adequate care.

Discussion

Multiple diastema of anterior teeth is a malocclusion condition that can disrupt a person's appearance and self-confidence.[4-6] Diastema of maxillary teeth is an aesthetic problem that often occurs compared to mandibular diastema.[4] Treatment of diastema can be done with orthodontic treatment, restorative treatment (direct composite veneers, indirect composite veneers, porcelain laminate veneers, all-ceramic crowns, metal-ceramic crowns), surgical correction, or a multidisciplinary approach depending on the etiology.[4,7,8] Direct and indirect adhesive restorations are a safe, predictable, and recom-

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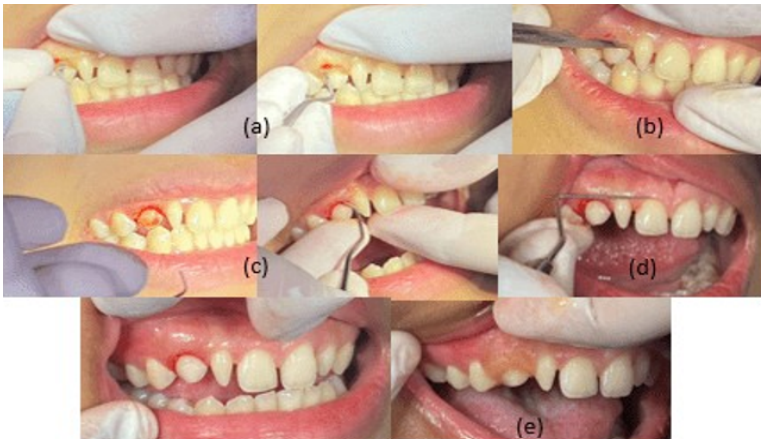

Figure 5. A. Crown lengthening of 53 by 1 mm, B. Cutting with blade number 15, C. Smoothing the cut with a curette, D. Final measurement, E. Application of the periodontal pack and the patient is given antibiotics and anti-inflammatory drugs

Figure 6. Colour matching with shade guide

Figure 7. Post preparation

Figure 8. Crown lengthening control

mended restoration for closing diastema.[4,6,8,9]

Veneers play an important role in smile restoration because of their ability to change the shape of teeth with a conservative approach. A specially made thin shell is bonded to the labial surface of the tooth to treat various aesthetic problems including discoloration, chips, cracks, diastema, and malalignment.[5] Veneers are the most popular method for diastema.[10] Composite resin veneers are veneers that have several advantages including economical, can be used as a temporary restoration during adolescence, can be repaired easily, easy to make, minimally invasive, only carried out in one stage, and takes a short time to carry out.[11-13] However, this material is less resistant to chewing and can also stain the restoration surface, marginal wall leaks, and it can cause disruption of gingival health if oral hygiene is poor.[13] These weaknesses make this material inferior compared to indirect veneers.[11] Treatment for aesthetic cases can involve multidisciplinary knowledge, one of which is using indirect veneers such as ceramics laminate veneers.[4,7,10]

Various ceramic materials have been widely used, such as lithium disilicate and zirconium oxide.[4] Veneers made from lithium silicate have increased strength and also provide high aesthetic results.[11,12] The material selection uses lithium disilicate not only because of its mechanical properties but also its good optical properties because it is in the anterior region.[4]

Peg-shaped teeth are defined as undersized, tapered maxillary lateral incisors and are associated with other dental abnormalities such as transposition of canine teeth or over-retained deciduous teeth.[13-15] Due to their reduced size and irregular tooth shape, this shape of the lateral incisor can cause the formation of another diastema in the anterior region and cause aesthetic problems.[5,15,17] Currently various techniques are available to treat this situation, such as orthodontic treatment, crowns, laminate veneers, and direct resin composite restorations.[14,15] Currently, ceramic veneers have been used widely and effectively in treating diastema with high aesthetic results.[17]

A variety of tooth-coloured materials are widely used especially silicate ceramics.[17] Lithium disilicate ceramics are superior to polymer-based materials in terms of abrasion resistance, flexural strength, and marginal color change of the material.

Restorations with resin composites in the literature showed higher levels of abrasion and
higher levels of discoloration compared to ceramic lithium disilicate restorations.[17]

Lithium disilicate veneers are made with a thickness of 0.3-0.5 mm.[17,19] Lithium disilicate veneers exhibit high wear resistance and optimal optical properties. This material requires minimally invasive preparation but provides optimal aesthetic results.[18] The finished line of the palatal veneer must be 1 mm palatal to the papilla as recommended by the rules assuming there is 1 mm between the roots of the teeth. If 2 mm is at the root, then the finished line must be 2 mm from the palatal to the contact point.[8] Lithium disilicate ceramic is used for single-unit

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Figure 9. Making impression with elastomer

Figure 10. Making temporary restoration

Figure 11. Try in of veneer

Figure 12. Clinical photo after insertion

crowns. In the literature, it is stated that its use as a material for bridge dentures has not been very successful.[19]

Selecting the right ceramic material can produce stable aesthetic quality while maintaining biocompatibility, abrasion resistance, good transparency, stable colour, and contour. Plaque deposition on ceramic veneers is lower so it can reduce gingival irritation.[20] The success of ceramic veneers is very dependent on the strength and durability of the bond formed between the 3 components of the bonding complex: tooth surface, ceramic, and luting resin composite. The ceramic used for laminate veneers is feldspathic ceramic which has the advantage of being able to imitate the appearance of natural teeth because of its high transparency and increased durability after being adhesively bonded to the teeth.[21]

Partial anodontia can occur for various reasons, the most common being agenesis of the permanent tooth replacement. Treatment for partial anodontia varies and depends on the condition of the root and crown, when the roots and crowns are in good condition, the teeth can be maintained and if aesthetic improvements are needed, the primary teeth can be reshaped.[22] Primary teeth in the smile zone cause patient dissatisfaction due to the size, alignment, and/or colour, as well as misalignment of the others teeth.[23] Ceramic crowns and veneers are valid treatment options for healthy teeth with improper shape or size. Although more expensive than direct restorations, indirect restorations lithium disilicate can be bonded to conservative tooth preparations to achieve high aesthetic quality and a natural appearance.[22,23] In this case, partial anodontia occurred on tooth 53 which did not have a permanent tooth germ for tooth 13 (the right canine on the maxilla).

A combined periodontal and restorative approach is sometimes necessary to analyze and solve aesthetic problems. So, initial intervention requires crown lengthening apically with periodontal surgery, towards the incisals with the addition of restorative material, or with a combination procedure to maintain ideal tooth proportion and alignment.[18] Crown lengthening is a surgical procedure carried out clinically before the restoration procedure which will create space for the supra-crestal fibers to reform.[24] Crown lengthening can be done only by reducing the soft tissue through gingivectomy or by reducing the soft tissue and alveolar bone. If the supracrestal tissue measurement (bone crest to gingival margin) is greater than 3 mm and attached gingiva of at least 2 mm will remain after surgery, then it is indicated for soft tissue reduction only.[24] The indication for crown lengthening is for subgingival caries or fractures. Crown length inadequate clinics for retention, gingival height that is not aesthetic.[25] Without a crown lengthening procedure, the teeth will appear short and unaesthetic. Crown lengthening on the remaining teeth can be done for functional and aesthetic reasons. The main function of this procedure is to increase retention and resistance to the tooth where the crown will be placed and change the proportions of the tooth.[18] In this case, due to deciduous tooth for 53 for restoration having unsimilar gingival height in order to manage inadequate axial height for restorative retention, cervical root resorption without alveolar crest reduction due biological width greater than 3 mm, functional crown lengthening may be necessary.[29]

In primary teeth that experience resistance, minimal preparation for veneers using lithium disilicate ceramic material must be carried out to prevent the possibility of root resorption caused by trauma and to obtain the benefits of enamel adhesion. Root resorption is a pathological condition characterized by the resorption of hard tissue (cementum and dentin) and can be caused, among other things, by mechanical or thermal trauma, such as by preparation using burs. The greater the amount of enamel, the better the adhesion and prognosis of the restorative treatment.[22]

In addition to selecting an adequate restorative approach, gingival health must also be achieved. Indirect restorations such as ceramic crowns and veneers will maintain proper

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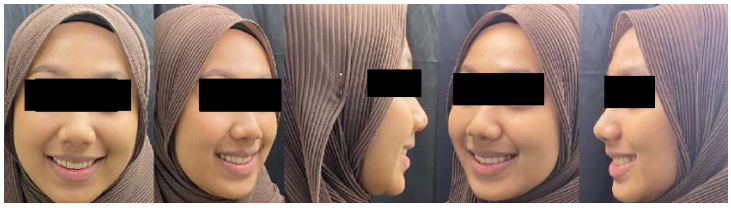

Figure 13. Extraoral photos after insertion

Figure 14. Extraoral photos of patient after 2 months follow-up

Figure 15. Profile photo of Veneer follow-up in 5th appointment

gingival margins and emergent profiles, reducing plaque retention which will contribute to the maintenance of periodontal health.[22] Several factors that play a role in the lack of aesthetics in the appearance of teeth are lack of aesthetic alignment of teeth, level of gingival tissue, smile lines, and periodontal morphology. The balance of the gingival architecture is very important in determining the shape and contour of the teeth. So interdisciplinary therapy is needed to establish harmony between tooth and gingival parameters.[6] The crown lengthening technique will provide satisfactory results if the patient has excessive gingival tissue and does not require bone remodeling intervention. This procedure is carried out by removing excess gingival tissue so the enamel covered by the gingiva can be seen.[6,18]

Deciduous teeth can be veneered with lithium disilicate. Lithium disilicate is a ceramic material with high torsional strength and high translucency which allows good aesthetic results. When applying veneers with lithium disilicate, it should be noted that this material has a special property called the "Umbrella effect" which allows light to pass through the material and be partially highlighted.[26] Lithium silicate ceramic combines superior mechanical properties with a high level of transparency and very good aesthetics.

This material is pressed to a thickness of 0.3 mm and will provide a strength of 400 MPa. This material is widely indicated to improve tooth shape and produce long-lasting aesthetic results, providing longer color stability than direct restorations.

The use of ceramic veneers makes it possible to condition the gingival tissue for papilla formation with a non-surgical procedure in which soft tissue topography is guided prosthetically. This requires the establishment of a gingival architecture based on the concept of cervical contour and contact points. Intrasulcular placement of the cervicoproximal margin is necessary to increase the emergence profile so it can cause gradual and natural closure of the diastema or black triangle.[16] Treatment of the black triangle with veneer restoration requires an appropriate crown height ratio between the connector and the incisors.[27] Reduction of anterior teeth enamel in the cervical area ranges from 0.4 mm and thickens towards the incisal 0.5-0.7 mm.[28]

Conclusion

An interdisciplinary approach is required to achieve an aesthetic smile and functional results. Aesthetic restorations must have an accurate contour match and be in harmony with the natural shape of the tooth and the surrounding gingival margin to obtain a good boundary between the restoration and the gingiva, preventing the build-up of food plaque which can cause gingival irritation. Lithium disilicate ceramic veneers are considered one of the most popular restorative materials in aesthetic dentistry because they provide good results so they can improve the patient's smile

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