



QUALITY IMPROVEMENT IN DENTAL AND MEDICAL KNOWLEDGE, RESEARCH, SKILLS AND ETHICS FACING GLOBAL CHALLENGES

Edited by

Armelia Sari Widyarman, Muhammad Ihsan Rizal,
Moehammad Orliando Roeslan & Carolina Damayanti Marpaung



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QUALITY IMPROVEMENT IN DENTAL AND MEDICAL KNOWLEDGE, RESEARCH, SKILLS AND ETHICS FACING GLOBAL CHALLENGES

The proceedings of FORIL XIII 2022 Scientific Forum Usakti conjunction with International Conference on Technology of Dental and Medical Sciences (ICTDMS) include selected full papers that have been peer-reviewed and satisfy the conference's criteria. All studies on health, ethics, and social issues in the field of dentistry and medicine have been presented at the conference alongside clinical and technical presentations. The twelve primary themes that make up its framework include the following: behavioral epidemiologic, and health services, conservative dentistry, dental materials, dento-maxillofacial radiology, medical sciences and technology, oral and maxillofacial surgery, oral biology, oral medicine and pathology, orthodontics, pediatrics dentistry, periodontology, and prosthodontics. This proceeding will be beneficial in keeping dental and medical professionals apprised of the most recent scientific developments.



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Moehammad Orliando Roeslan and Carolina
Damayanti Marpaung
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Preface

Faculty of Dentistry Universitas Trisakti (Usakti) presents FORIL XIII 2022 Scientific Forum Usakti conjunction with International Conference on Technology of Dental and Medical Sciences (ICTDMS) on December 8th–10th 2022. The theme of the conference is “Quality Improvement in Dental and Medical Knowledge, Research, Skills and Ethics Facing Global Challenges”.

The triennial conference has served as a meeting place for technical and clinical studies on health, ethical, and social issues in field medical and dentistry. It is organized around 12 major themes, including behavioral, epidemiologic, and health services, conservative dentistry, dental materials, dento-maxillofacial radiology, medical sciences and technology, oral and maxillofacial surgery, oral biology, oral medicine and pathology, orthodontics, pediatrics dentistry, periodontology, and prosthodontics.

The most recent findings in fundamental and clinical sciences related to medical and dental research will be presented in the conference that will be published as part of the conference proceeding. This proceeding will be useful for keeping dental and medical professionals up to date on the latest scientific developments.

Dr. Aryadi Subrata
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Diastemas management using direct composite resin restoration: The digital smile design approach

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ABSTRACT: Background: Nowadays, the aesthetic appearance of teeth has an essential role in daily life. Teeth with anterior diastema often interfere with the patient's confidence. A simple and easy way to restore diastemas is direct composite resin veneer restoration with a minimally invasive technique, but the macro- and micro-facial analysis are essential before the clinical application. The clinician should improve their understanding of smile design to preserve teeth structure and enhance the success of the treatment. Case Report: This paper reported the treatment of anterior multiple diastemas using direct composite resin veneers and initiated with smile design analysis. Case Management: A 22-year-old female patient presented with a chief complaint of her anterior teeth spacings. On examination, multiple diastemas were found on maxillary and mandibular anterior teeth. She has small-shaped teeth and an intrusive profile. On the first visit, we took dental impressions and patient photos. Macro- and microanalysis were performed using a digital smile design, and an 80% RED proportion was also determined. The preparation was performed only to smooth the teeth' surface, and after the etching and bonding procedure, the nanohybrid composite resin was applied with one shade technique. Recurring Esthetic Dental (RED) proportion can be used besides Golden Proportion. Conclusion: Direct resin composite veneers with a digital smile design can be considered an important initial analysis to support the success of the treatment. Several advantages can be achieved, such as knowing the estimated final result and improving patient satisfaction.

1 INTRODUCTION

Dental aesthetic restoration is one of the crucial things to be noticed. Restorative in dental practice also has developed rapidly, especially in adhesive dentistry. As we know, porcelain veneering is considered to be standard in managing the aesthetic case, but there are several limitations. Due to eliminating the healthy tooth structure, many direct techniques are also developed to conserve the tooth. The evolution of nanohybrid composite resins and direct composite restoration has also expanded in many clinical cases, including veneer cases. Direct composite veneer has many advantages, it can be finished in one visit appointment, shorter time needed and is more economical, adheres to the minimally invasive principle, and conserves natural tooth structure. One important thing to be considered is the operator skills needed in performing the treatment, especially in preliminary treatment such as digital smile design (Elline 2019; Sheikh *et al.* 2015). According to a previous study, composite veneers do not need much preparation. The enamel structure is preserved to maximize the

adhesive system (Alothman & Bamasoud 2018). In this case, we performed direct composite restorations to overcome the diastema problems in several anterior teeth. In this procedure, we found a nonideal horizontal plane with an ideal midline. We took the facial photograph and analyzed them with a digital smile design. We found the before-after condition with the patient's final design needs (Morita *et al.* 2016).

2 CASE REPORT

A 20-year-old female patient with diastema problems discussed for a solution to restore her teeth because she felt uncomfortable with her smile. However, she did not want to take an orthodontics approach that lasted several sessions or high-cost restoration. She asked whether any other restoration can be completed in one visit.

2.1 Clinical examination and diagnosis

The patient's oral hygiene was acceptable, with healthy periodontal tissues and no staining. No plaque accumulation or calculus around the teeth. The gingival area was also normal. On the centric occlusion, the position was a deep bite.

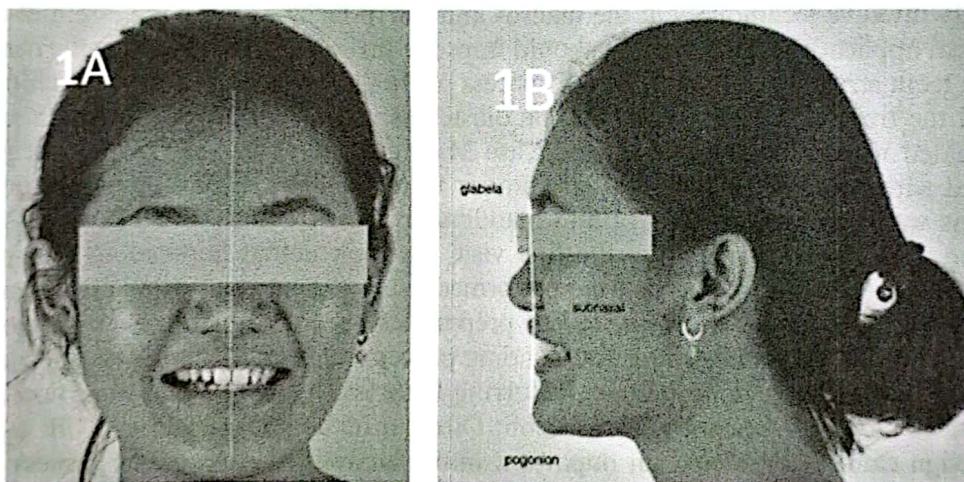


Figure 1. (A) The patient has a normal midline and, (B) concave profile.

The aesthetic analysis showed that the patient's smile performed average smile with downward lip curvature. The patient has a normal midline face and a concave profile (Figure 1A, B). It was observed that anterior teeth #13 to #23 have diastemas. The uncomfortable prominent unaesthetic space between #11 and #21 is about 2 mm (Figure 2A).

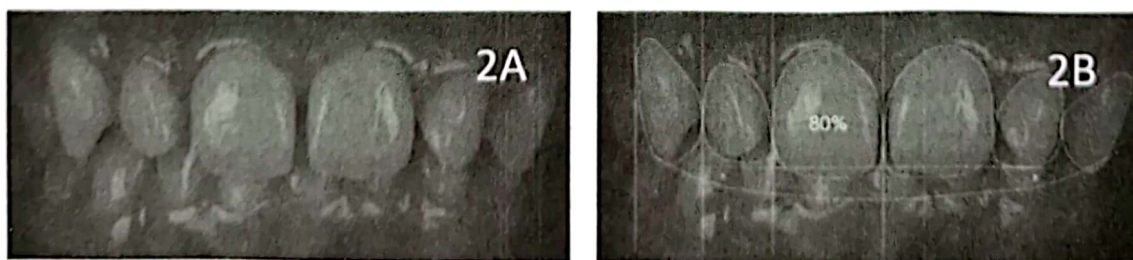


Figure 2. (A) Deep bite occlusion with diastemas in #13 to #23 about 2 mm, (B) we designed an 80% RED proportion.

The teeth proportion was normal with 80% width from length proportion according to RED proportion. The smile analysis showed several problems (Figure 2B). The patient has a deep bite occlusion, so we didn't perform tooth lengthening in #11 and #21. The lengthening was only carried out on #13 and #12, and the reshaping of #22 and #23 (Figure 1B). All teeth were diagnosed with healthy pulp and periapical tissue. Of the patient's condition, we decided to restore conservatively by using the single shade technique (Index & Leaders 2020).

The cleaning procedure and light sanding were established to eliminate the surface debris in the area to be restored. The direct veneer was done with a minimally invasive technique, only bevelling in the proximal and the restored areas. The prepared teeth surface was etched for 15 seconds (Ultra-Etch, Ultradent, USA) and rinsed with flowing water, and dried with the three-way syringe. Next, an adhesive bonding agent (Universal Bonding, Dentsply, Switzerland) was applied using a microbrush with a rubbing motion on the enamel surface of the teeth and light cured for 20 seconds. We did the restoration from the mock-up model using resin composite from midline palatal then proximal and labial parts #11 and #12 using A3 color shade (Palfique LX5, Tokuyama, Japan). Next, we lengthened #13 and #12 to achieve proportional teeth length based on the smile analysis, #22 and #23 also added resin composite in the mesial and incisal area. They were contoured to get the ideal lateral incisor and canine shapes using a tapered fissure superfine diamond bur (TC-21EF, Mani, Japan). Finally, all the preparation surfaces were polished, using coarse red, dark orange, light orange, and yellow disc colors (Sof-Lex-XT,3M, USA) to perform a smooth surface and shape the incisal embrasures. The teeth were smoothed again with a medium rubber cup (blue FlexiCup, Cosmedent, Chicago, USA), followed by a rubber cup (pink FlexiCup, Cosmedent, Chicago, USA) (Index & Leaders 2020), and a dental polishing brush (Ultradent, Japan). Several postoperative instructions are given to the patient, such as brushing the teeth normally two times a day with a soft toothbrush, Resin material can stains from color foods, Avoids habits such as opening something with your teeth, chewing ice, and nail. If there is any chipping, it can be repaired.

The patient felt very satisfied with the result and could restore her diastemas problem in one visit of treatment (Figure 3A, B). Post six months treatment evaluation was done, and there were no complaints at all from the patient (Figure 3C). There were no chipping or discoloration, and the patient can socialize better than before the treatment.

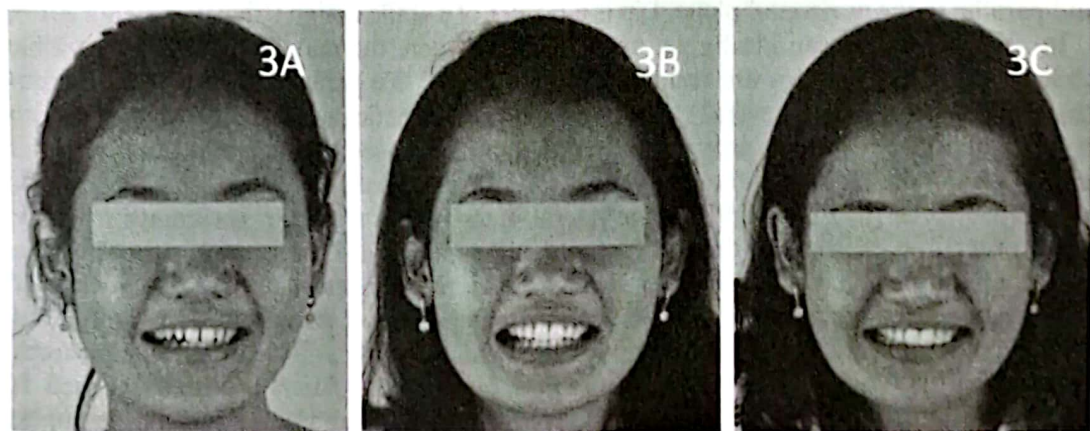


Figure 3. (A) Before the treatment, (B) The final result of one visit direct veneer restoration, (C) six months post-treatment evaluation.

3 DISCUSSION

The midline diastemas are defined with a space of more than 0,5 mm in between the central incisor of the maxilla. The clinicians should determine the best treatment, whether with orthodontics, surgery, or a conservative approach (Kabbach *et al.* 2018). The development of direct cosmetic dentistry has an essential role in clinical application due to the rapid progression of the resin composite developed adhesive system and material. Direct treatment of diastemas cases with a single visit procedure has several advantages, and many patients satisfy with the result (Korkut 2018). There are several advantages of the direct resin composite treatment. It is economically cost, and repairable, and we can do minimally invasive technique). The operators have also been provided with good quality materials, allowing them to perform better esthetic and durable restoration with economically friendly (Goyal *et al.* 2016). Among the advantages of the composite, polishing material, and the success rate of the composite, the concern of handling direct resin composite treatment with freehand technique needs a lot of practice and can be a weakness to some operators (Sheikh *et al.* 2015). Sometimes, failures such as teeth color and chipping discrepancies can happen, but most of them can be repaired and polished (Kabbach *et al.* 2018).

In the present case, we decided to close diastemas using composite material because it was suitable for the indication and the patient's desire. It was also the most conservative treatment. We prepared the diastemas area in a minimally invasive technique, and according to the previous study, they also prepared the teeth surfaces without any preparation and directly restored them in one visit. There are three criteria for ideal diastema closure: an enhancement of emergence profile with natural tooth color and contours in all interfaces with no black triangle, well-covered tooth embrasures, and the fine margin at subgingival area that dental floss can pass smoothly (Goyal *et al.* 2016). In this case, minimal preparation was performed because of the concave profile, so it intended to emerge the patient profile. The composite resin was an attempt to mimic dental enamel and dentin color. We used polytetrafluoroethylene (PTFE) tape to isolate the adjacent tooth, and it can avoid adhesion with the adjacent tooth, but sometimes it prevents a clear view of the working area (Kabbach *et al.* 2018).

Anterior aesthetic management considers several connected analyses: the face, dental and lips, tooth characterization, and dental to gingiva attachment (Muryani 2017). Digital smile design can be initially determined by macro analysis (face, lip, gingiva, and teeth), and microanalysis (color and teeth shape). Second, it can be taken specifically from shapes, colors, and teeth aesthetic treatment. Third, it can be identified by advanced classification, five aesthetic levels, face, mouth-face, mouth, and teeth dentogingival (Muryani 2017). In the aesthetic approach, the interpupillary line should be perpendicular to the face midline and parallel to the horizontal plane. Lip is a border of a smile design (Bhuvanewaran 2010).

In this patient, we can ideally get an ideal smile where the maxilla incisors were visible about 1 mm when the lips are resting (Muryani 2017). We performed an 80% RED proportion, and according to several studies, the recurring esthetic dental (RED) proportion can be used besides the golden proportion. RED approaches several individual elements and states that an ideal width of the maxilla incisor as the frontal look should remain constant and improve distally. The width of the lateral incisor is decreased in percentage from the width of the first incisor, and the width of remaining teeth is also decreased by the same size as its mesial tooth. The 70% RED portion, with a width/height ratio of the maxillary incisor that is related to the body/tooth height, has been recommended for normal-length teeth, but some studies performed an 80% RED portion to shorter teeth or 78% ratio in longer teeth (Barakah 2021; Ward 2015). The ideal horizontal plane of this patient is not yet obtained. It may be related to dentofacial deformities, especially in the mandibular position. It can be caused by abnormal development of patients' jaw, and the prevalence among Asians is high (Zhou *et al.* 2017).

4 CONCLUSION

In the present diastemas closure case, digital smile design was carefully taken and it provides a more predictable result. The RED portion was used, and it fulfilled the patient's expectations. The direct resin composite restoration in a single-visit treatment improves patient satisfaction, is acceptable in certain aesthetic cases and has several advantages.

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Diastema

by Ie Elline Istanto FKG

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**Diastemas Management Using Direct Composite Resin Restoration:
The Digital Smile Design Approach**

Background

Dental aesthetic restoration is one of the crucial things to be noticed. Restorative in dental practice also has developed rapidly, especially in adhesive dentistry. As we know, porcelain veneering is considered to be standard in managing the aesthetic case, but there are several limitations. Due to eliminate the healthy tooth structure, many direct techniques are also developed to conserve the tooth. The evolution of nanohybrid composite resins and direct composite restoration has also expanded in many clinical cases, including veneer cases. Direct composite veneer has many advantages, it can be finished in one visit appointment, shorter time needed and is more economical, adheres to the minimally invasive principle, and conserve natural tooth structure. One important thing to be considered is the operator skills needed in performing the treatment, especially in preliminary treatment such as digital smile design.^{1,2} According to a previous study, composite veneers do not need much preparation. The enamel structure is preserved to maximize the adhesive system.³ In this case we performed direct composite restorations to overcome the diastema problems in several anterior teeth. In this procedure, we found a nonideal horizontal plane with an ideal midline. We took the facial photograph and analyzed them with a digital smile design. We found the before-after condition with the patient's final design needs.⁴

Case Report

A twenty-year-old female patient with diastema problems discussed for a solution to restore her teeth because she felt uncomfortable with her smile. However, she did not want to take an orthodontics approach that lasted several sessions or high-cost restoration. She asked whether any other restoration can be completed in one visit.

Clinical Examination and Diagnosis

The patient's oral hygiene was acceptable, with healthy periodontal tissues and no staining. No plaque accumulation or calculus around the teeth. The gingival area was also normal. On the centric occlusion, the position was deep bite.

The aesthetic analysis showed that the patient's smile performed average smile with downward lip curvature. The patient has a normal midline face and a concave profile (Figure 1A, B). It was observed that anterior teeth #13 to #23 have diastemas. The uncomfortable prominent unaesthetic space between #11 and #21 is about 2 mm (Figure 2A).

The teeth proportion was normal with 80% width from length proportion according to RED proportion. The smile analysis showed several problems (Figure 2B). The patient has a deep bite occlusion, so we didn't perform tooth lengthening in #11 and #21. The lengthening was only carried out on #13 and #12, and the reshaping of #22 and #23 (Figure 1B). All teeth were diagnosed with healthy pulp and periapical tissue. From the patient's condition, we decided to restore conservatively by using the single shade technique.⁵

The Clinical Protocol

The cleaning procedure and light sanding was established to eliminate the surface debris in the area to be restored. The direct veneer was done with a minimally invasive technique, only bevelling in the proximal and the restored areas. The prepared teeth surface was etched for 15 seconds (Ultra-Etch, Ultradent, USA) and rinsed with flowing water, and dried with the three-way syringe. Next, an adhesive bonding agent (Universal Bonding, Dentsply, Switzerland) was applied using a microbrush with a rubbing motion on the enamel surface of the teeth and light cured for 20 seconds. We did the restoration from the mock-up model using resin composite from midline palatal then proximal and labial parts #11 and #12 using A3 color shade (Palfique LX5, Tokuyama, Japan). Next, we lengthened #13 and #12 to achieve proportional teeth length based on the smile analysis, #22 and #23 also added resin composite in the mesial and incisal area. They were contoured to get the ideal lateral incisor and canine shapes using a tapered

fissure superfine diamond bur (TC-21EF,Mani,Japan). Finally, all the preparation surfaces were polished, using coarse red, dark orange, light orange and yellow disc color (Sof-Lex-XT,3M,USA) to perform a smooth surface and shape the incisal embrasures. The teeth were smoothed again with a medium rubber cup (blue FlexiCup, Cosmedent,Chicago,USA), followed by a rubber cup (pink FlexiCup, Cosmedent,Chicago,USA)⁵, and a dental polishing brush (Ultradent,Japan). Several post operative instructions given to the patient, such as brush the teeth normally two times a day with soft toothbrush, Resin material can stains from color foods, Avoids habits such as opening something with your teeth, chewing ice, nail. If there any chipping it can be repaired.

The patient felt very satisfied with the result and could restore her diastemas problem in one visit treatment (Figure 3A,B). The post six months treatment evaluation were done, and there were no complaints at all from the patient (Figure 3C). There were no chipping, discoloration, and the patient can socialized better than before the treatment.

Discussion

The midline diastemas are defined with a space of more than 0,5 mm in between the central incisor of the maxilla.The clinicians should determine the best treatment,whether with orthodontics, surgery or a conservative approach.⁶ The development of direct cosmetic dentistry has an essential role in clinical application due to the rapid progression of the resin composite developed adhesive system and material. Direct treatment of diastemas cases with a single visit procedures has several advantages, and many patients satisfy with the result.⁷ There are several advantages of the direct resin composite treatment. It economically cost, repairable, and we can do minimally invasive technique). The operators have also been provided with good quality materials, allowing them to perform better esthetic and durable restoration with economically friendly.⁸ Among of the advantages of the composite, polishing material,and the success rate of the composite, the concern of handling direct resin composite

treatment with freehand technique needs a lot of practice and can be a weakness to some operators.¹ Sometimes, failures such as teeth color and chipping discrepancies can happen, but most of them can be repaired and polished.⁶

In the present case, we decided to close diastemas using composite material because it was suitable for the indication and the patient's desire. It was also the most conservative treatment. We prepared the diastemas area in a minimally invasive technique, and according to the previous study, they also prepared the teeth surfaces without any preparation, and directly restored in one visit. There are three criteria for ideal diastema closure: an enhancement of emergence profile with natural tooth color and contours in all interfaces with no black triangle, well-covered tooth embrasures, and the fine margin at subgingival area that dental floss can pass smoothly.⁸ In this case, minimal preparation was performed because of the concave profile, so it intended to emerge the patient profile. The composite resin was an attempt to mimic dental enamel and dentin color. We used polytetrafluoroethylene (PTFE) tape to isolate the adjacent tooth, and it can avoid adhesion with the adjacent tooth, but sometimes it prevents a clear view of the working area.⁶

Anterior aesthetic management considers several connected analyses: the face, dental and lips, tooth characterization, and dental to gingiva attachment.⁹ Digital smile design can be initially determined by macro analysis (face, lip, gingiva, and teeth), and microanalysis (color and teeth shape). Second, it can be taken specifically from shapes, colors, and teeth aesthetic treatment. Third, it can be identified by advanced classification, five aesthetic levels, face, mouth-face, mouth, and teeth dentogingival.⁹ In the aesthetic approach, the interpupillary line should be perpendicular to the face midline and parallel to the horizontal plane. Lip is a border of a smile design.¹⁰

In this patient, we can ideally get an ideal smile where the maxilla incisors were visible about 1 mm when the lips are resting.⁹ We performed 80% RED proportion, and according to

several studies Recurring Esthetic Dental (RED) proportion can be used besides Golden Proportion. RED approaches several individual elements, it states that an ideal width of the maxilla incisor as the frontal look should remain constant and improve distally. The width of the lateral incisor is decreased in percentage from the width of the first incisor, and the width of remain teeth is also decreased by the same size as its mesial tooth. The 70% RED portion, which width/height ratio of the maxillary incisor that is related to the body/tooth height, has been recommended for normal-length teeth, but some studies performed 80% RED portion to shorter teeth or 78% ratio in longer teeth.^{11,12} The ideal horizontal plane of this patient is not yet obtained. It may be related to dentofacial deformities, especially in the mandibular position. It can be caused by abnormal development of patients' jaw, and the prevalence among Asians is high.¹³

Conclusion

In the present diastemas closure case, digital smile design was carefully taken and it provides a more predictable result. The RED portion was used, and it fulfilled the patient expectation. The direct resin composite restoration in a single-visit treatment improves patient satisfaction, it is acceptable in certain aesthetic cases, and has several advantages.

Acknowledgment

None

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FIGURES

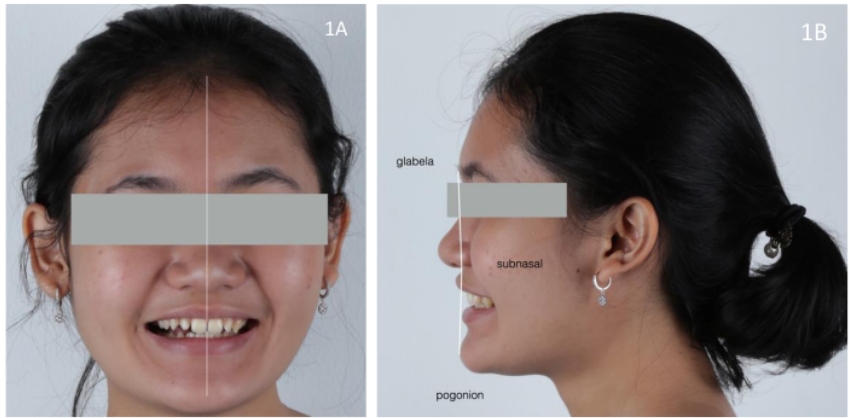


Figure 1A.The patient has a normal midline (tambahkan foto midline) and (B) concave profile

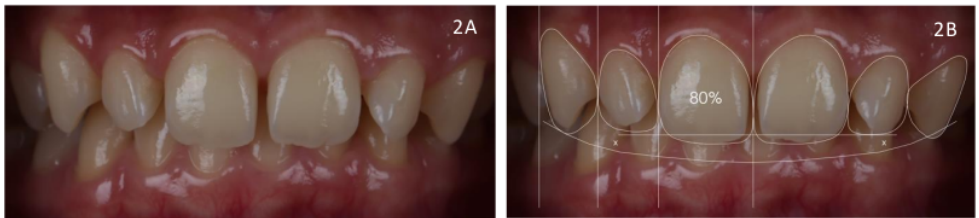


Figure 2A.Deep Bite occlusion with diastemas in #13 to #23 about 2 mm (B) we designed 80% RED proportion

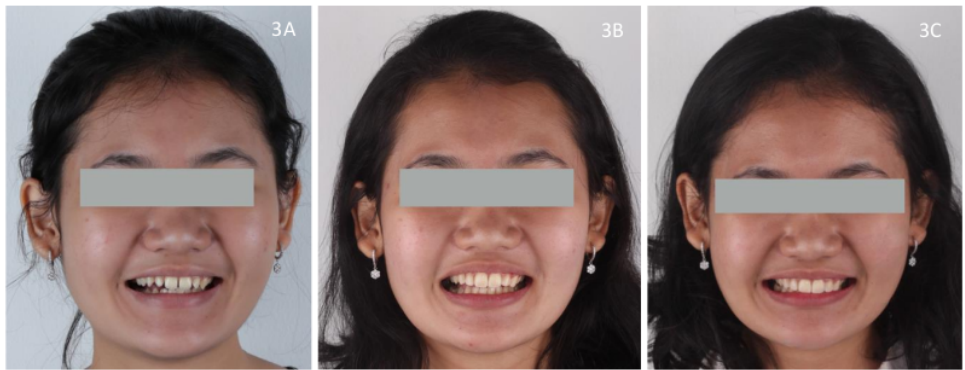


Figure 3(A) Before the treatment, (B)The final result of one visit direct veneer restoration, (C) six months post-treatment evaluation

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