

Case Report

Indirect veneer treatment of anterior maxillary teeth with enamel hypoplasia

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ABSTRACT

Background: Nowadays, aesthetic rehabilitation becomes a necessity. It is affected by patient's background, especially career, social and economic status. The aesthetic abnormality of anterior teeth i.e discoloration, malposition and malformation can affect patient's appearance, especially during smile. These dental abnormalities, as a result, can decrease patient's performance. Dental malformation, for instance, can be caused by developmental tooth defect, such as enamel hypoplasia. Enamel hypoplasia is a developmental defect caused by the lack of matrix amount which leads to thin and porous enamel. Enamel hypoplasia can also be caused by matrix calcification disturbance starting from the formation and development of enamel matrix causing defect and permanent changes which can occur on one or more tooth. **Purpose:** The aim of the study is to improve dental discoloration and tooth surface texture on anterior maxillary teeth with enamel hypoplasia by using indirect veneer with porcelain material. **Case:** A 20 years-old woman with enamel hypoplasia came to the Dental Hospital, Faculty of Dentistry Airlangga University. The patient wanted to improve her anterior maxillary teeth. It is clinically known that there were some opaque white spots (chalky spotted) and porous on anterior teeth's surface. **Case management:** Indirect veneer with porcelain material had been chosen as a restoration treatment which has excellent aesthetics and strength, and did not cause gingival irritation. As a result, the treatment could improve the confidence of the patient, and could also make their function normal. **Conclusion:** Indirect veneer is an effective treatment, which can improve patient's appearance and self confidence.

Key words: Indirect veneer, porcelain, enamel hypoplasia, aesthetics

ABSTRAK

Latar belakang: Saat ini perbaikan estetik menjadi suatu kebutuhan. Kebutuhan akan estetik dipengaruhi latar belakang penderita, terutama karir, status sosial dan ekonomi. Hal ini disebabkan, kelainan estetik seperti diskolorasi, malposisi, malformasi, dapat mempengaruhi penampilan penderita terutama saat tersenyum. Kelainan gigi tersebut pada akhirnya dapat memperburuk penampilan penderita. Malformasi gigi dapat disebabkan oleh kelainan pada masa perkembangan gigi, misalnya hipoplasia enamel. Hipoplasia enamel adalah kelainan perkembangan yang disebabkan sedikitnya matriks enamel sehingga terjadi ketipisan dan porusnya enamel. Hipoplasia enamel dapat disebabkan gangguan kalsifikasi matriks saat pembentukan dan perkembangan matriks enamel, kerusakan dan perubahan permanen ini dapat melibatkan satu atau beberapa gigi. **Tujuan:** Tujuan perawatan ini memperbaiki diskolorasi dan tekstur permukaan gigi depan rahang atas akibat hipoplasia enamel menggunakan veneer indirek berbahan porselen. **Kasus:** Seorang penderita wanita 20 tahun dengan hipoplasia enamel datang ke Rumah Sakit Gigi dan Mulut Pendidikan Fakultas Kedokteran Gigi Universitas Airlangga. Penderita ingin memperbaiki gigi depan rahang atas yang secara klinis tampak bercak putih opak seperti kapur dan porus pada permukaan labial gigi. **Tatalaksana kasus:** Veneer indirek dengan bahan porselen dipilih sebagai restorasi oleh karena segi estetik, kekuatan dan tidak mengiritasi ginggiva. Restorasi ini dapat meningkatkan kepercayaan diri penderita dan memperbaiki fungsi gigi. **Kesimpulan:** Veneer indirek merupakan perawatan yang efektif, dapat meningkatkan penampilan dan kepercayaan diri penderita.

Kata kunci: Veneer indirek, porselen, hipoplasia enamel, estetik

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INTRODUCTION

Aesthetic appearance is a major concern for most people, especially women. Abnormality on the anterior teeth, especially upper jaw, will make everyone less comfortable and less confident.¹ Dental malformation, dental malposition, dental crowded, diastema, fractures, dental discoloration with or without caries, and developmental abnormalities caused by disturbances occurred during tooth growth, such as enamel hypoplasia and tetracycline; can reduce the aesthetic appearance. One of the developmental abnormalities causing dental discoloration is enamel hypoplasia. Enamel hypoplasia is caused by disturbances occurred during enamel matrix calcification process, initiated by the process of the formation and the subsequent growth of enamel matrix in the form of defect, i.e. permanent changes which can occur on one or more teeth.²

Enamel hypoplasia can be considered as a developmental disorder caused by the reduced number of enamel matrix, causing hollow and thin enamel. Degrees of hypoplasia that are caused by systemic disorders reflected in the severity, timing, and duration of occurrence of the disorder; as a result, the systemic disorders usually attack many teeth, and the defect positions of their enamel are related to enamel formed during the disturbances occurred.³

The treatment of enamel hypoplasia can be postponed until patients began to care about her appearance. The purpose of the treatment is to improve the discoloration aesthetically. Several techniques even have already been developed to treat teeth with enamel hypoplasia, such as composite resin restorations, composite direct veneer, porcelain indirect veneers and porcelain crowns. The selection of restoration depends on the severity of enamel hypoplasia.^{1,3,4}

Veneer technique is not a new way in improving the shape and color of teeth. Nevertheless, precision factor is needed in the procedure of this technique which is still less understood by practitioners in Indonesia. In the dictionary, veneering means to cover anything with a coating in order to have a better appearance. Current development in dentistry and the various technologies supporting both manufacturing techniques and materials, especially with the discovery of the 7th generation of bonding technology, the dental veneers gives more satisfactory results. It can stimulate the development of cosmetic dentistry as the bonding technology and the veneer can mutually support each other.⁵

Based on the treatment technique, it is known that there are two kinds of veneer, direct veneer and indirect veneer. The main material used for direct veneer is resin composite (partial veneer and entire veneer), especially nanofill type, since this material can be polished, so the result will look like the actual enamel and the polishing results can survive for long periods of time. Materials used for indirect veneer are composite resin, acrylic resin, porcelain and ceromer. Among those materials, porcelain can give the best results in durability and aesthetic color. Porcelain is also considered

as the material that can give the best results, especially in durability, color, translucency, dental adaptation, the edge density, biocompatibility, insolubility in oral fluids and a good surface texture. However, this material tends to become brittle.^{3,5}

Dental veneer is indicated for tooth discoloration with severe degrees such as tetracycline, restoration which has color changes, light diastema either central or multiple, enamel defect, and deformity of dental anatomy. Nevertheless, it can be contraindicated if the patient wants cosmetic instant with a class III malocclusion, edge to edge relationships and bad habits (such as bruxism, nails and pencils biting), short crowns, and enamel which can not be enough to be etched.⁵

The aim of this case report is to show how teeth with enamel hypoplasia can be treated by indirect veneer with porcelain material.

CASE

A twenty year old female patient came to Dental Hospital of Dental Faculty of Airlangga University Surabaya, with her main complaint about the color of her anterior teeth suffering from patches of white and porous. Moreover, she had no pains, and the palatal of 11 was filled 2 years ago. Based on the objective examination, teeth 13, 12, 11, 21, 22, 23 got color changes and had calculus (Figure 1). There was no complaint on pressure and percussion tests. The teeth was vital and clinical diagnosis were enamel hypoplasia. The treatment plan was indirect veneer restorations with porcelain materials. Finally, the prognosis of the treatment known was also good.

CASE MANAGEMENT

The diagnosis and the treatment plans as well as digital photographs were conducted before the treatment. After obtaining patients approval, the suitable tooth color was selected through Vitalumin shade guide, as a result, incisal section was A2, body was A2, and cervical was A3. The impression was then taken in order to obtain the working model of the temporary veneer. In the second visit, preparation on the labial surface of study model was done in order to make temporary veneer and it can be use as the guide of the preparation that would be conducted on the patient teeth later.

Tooth preparation was done on the third visit after gingival management was conducted by using retraction thread, so the margin of the preparation could reach sub gingiva, not exceed than 0.5 mm from the gingival margin. After infiltration anesthesia was given, preparation of the teeth was done according the preparation on the working model. The preparation on the tooth labial surface, was started by using depth cut bur to create the depth of preparation, 2 mm, so on the dental labial niche was then

formed and continued by flattening the entire labial surface by using a two-grit diamond bur. The preparation in the cervical area, was precisely conducted on gingival crest with a depth of 0.5 mm and chamfer shaped. In the proximal area, the chamfer marginal preparation was done without eliminating the proximal contact area. The incisal area was cut about 1 mm parallel to the incisal area (Figure 2).

After all of those procedures were accomplished, the result of the preparation was smoothed with a finishing bur. After the preparation was completed, the entire tooth surface was then cleaned with pumice powder and water by using a rotary brush. Nevertheless, before the first impression was conducted, the gingival management was conducted again by using retraction thread, so the result of the preparation, especially in the cervical area, could clearly be visible. Then, the impression was taken by using double impression material. After that, bite registration was conducted, and temporary veneer was inserted with freegenol material. After obtaining a working model, the cervical area was ditched in order to obtain a clear preparation border.

In the fourth visit, the porcelain veneer trial was conducted. The relationship between the teeth and the veneers were observed, whether there was a gap; whether the position of the veneer was stable; and whether the incisal area of the veneer was in conformity with the incisal area of the teeth. Finally, the occlusion was examined. However the preparation of the teeth and the veneer restoration was started, the color selection of flowable composite resin was also conducted to maximize the aesthetic appearance.

The teeth were cleaned with a mixture of pumice powder and water in order to remove the contamination of plaque and temporary crown-cement residue. In order not to impede the process of enamel etching, the pumice powder must not contain oil and fluorine. The working area was isolated with cotton roll and celluloid ribbon set on the interproximal teeth. Etching process was conducted on the teeth with 37% phosphoric acid for about 20 seconds. The teeth were then washed with water spray and dried. After that the bonding material was applied, thinned by using air

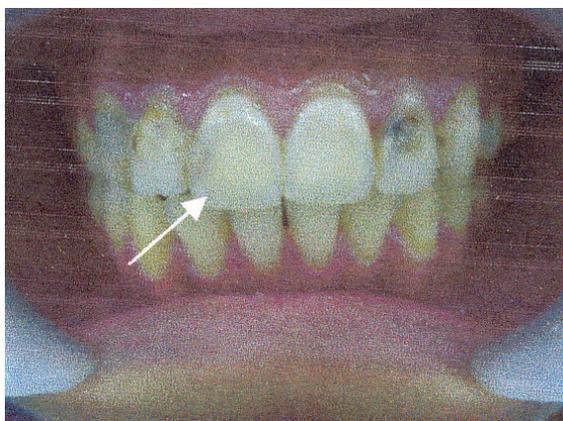


Figure 1. The condition of the anterior teeth before the treatment.

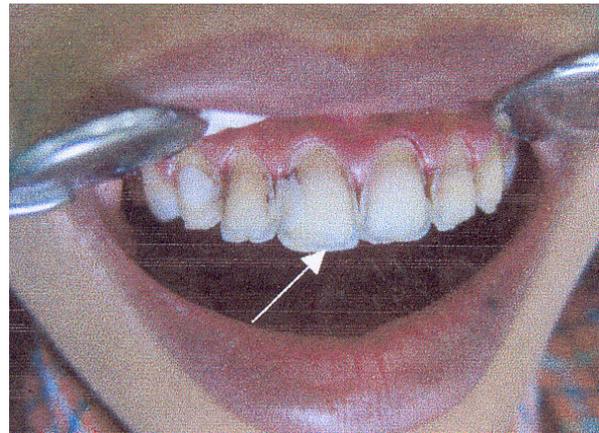


Figure 2. Tooth preparation.

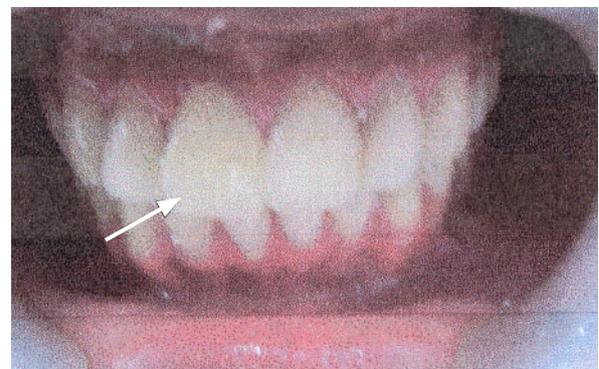


Figure 3. The insertion of the porcelain veneer.

spray, and then exposed with visible light for 20 seconds. The preparation of the veneer restoration was conducted by etching procedure on the surface of the porcelain veneer using hydrofluoric acid, 9.5% for 30 seconds. Next, it was washed with distilled water, and dried with air spray. Silanes was applied as coupling agent, let stand for 1 minute, thinned with air spray, and then exposed with visible light for 20 seconds. A thin layer of flowable resin composite was then applied and smoothed on the entire surface of the veneer. Afterwards, it was gently placed and pressed on the tooth surface that had been given the celluloid on the mesial and distal areas. The strong pressure, however, could cause cracks in the veneer porcelain. The excess composite around the veneer was then cleaned, and the veneer was exposed with visible light for 40 seconds on each side. During the exposure, the veneer must always be pressed with fingers. After the insertion was completed, the occlusion was then re-examined, and should be free from traumatic occlusion (Figure 3). Finally, the patient was advised to control further.

The first controls were then conducted in one week, two weeks, and one year after the insertion process, not only based on the anamnesa results whether there were not any complaints from patients, but also based on the extra-oral examination whether there were no abnormality and swelling. During intra oral examination, it is also known

that the veneer was not cracked or broken. Based on the percussion and pressure test, it was known that there were no complaints and gingiva around the teeth was normal, and teeth 13, 12, 11, 21, 22, 23 are known vital. Finally, instructions must be informed to the patient in order to improve her oral hygiene.

DISCUSSION

The main objective of the restorative dentistry is not only to repair tooth defects through the restoration process of dental anatomy and function, but also to protect dental supporting tissues.⁶ Veneer is a thin layer of tooth-colored materials applied to the labial surface of teeth in order to restore one or more teeth suffering from defects on their enamel, discoloration, malposition, and malformation.⁷ Indirect veneer even has become an alternative treatment to restore anterior teeth because of the conservative principles of its preparation and its high aesthetic value. In recent years, porcelain veneer has been widely accepted as a restoration treatment in the aesthetic dentistry. Porcelain veneer can also be used to correct the dental abnormalities related with its color, shape, and size, diastema, and dental fracture.⁸

Diagnosis is the first important stage in the treatment and it is important to design the future treatment planning.⁷ Thus, information about patient's motivation, patient's history of dental and general health, and patient's problems related with his/her daily habits should be explored as complete as possible. Future treatment plan is determined based on the clinic examination. In indirect veneer treatment, the selection of material used will be based on both patients' expectation of care and their economic status.⁸

In this case, it is diagnosed that the patient got an intrinsic discoloration due to enamel hypoplasia. Some of her anterior maxillary teeth even were clinically known suffering not only from white spots, but also from rough surface texture and porous. This discoloration of the tooth surface could be caused by enamel defects occurred during periods of tooth growth. Demineralization and failures in the process of calcification of the enamel, can produce white spot of hypoplasification.¹ Therefore, some enamel hypoplasia treatments, such as: tooth whitening, abrasion techniques, direct or indirect veneer, and jacket crown, can be choosed depend on its severity level. In enamel hypoplasia, in which lesions are clinically chalky white, tooth whitening can be conducted as the treatment. Abrasion technique, on the other side, can be used for mild cases of enamel hypoplasia in which there are clinically small superficial ditches. In enamel hypoplasia, in which the majority of tooth enamel, ± 2 to 2.5 mm is attacked or only a thin layer of enamel is left, the direct and indirect veneers can become the appropriate treatments.⁹⁻¹¹ Veneer restoration is considered to be more profitable than jacket crown since the preparation only occurs on the enamel, so it will not disturb the vitality of the pulp and the health of the periodontal tissue.¹²

The selection of the indirect veneer with porcelain material in this case is actually because it can give aesthetic and strength as same as those in the original teeth, such as the color quite stable and natural; the periodontal health can be controlled since the surface of the porcelain can reduce the accumulation of plaque more compared to other kinds of veneer; the resistance to abrasion and the usage are high; it can also resist to fluid absorption; the rate of fractures is low; and the level of recurrent caries is low. Porcelain veneer needs hydro fluorid acid 9.5% etching, which has high strength of adhesion on the etched enamel through the medium of resin-bonding, so the strength of this veneer is higher than that of other types.^{13,14}

In addition, the success of the aesthetic restoration treatment on the anterior teeth related with the satisfaction of patients towards the results obtained is also determined by the communication not only between dentists and patients, but also between dentists with the laboratory technician.¹⁴ Instruction after the insertion process must be informed to the patient. Besides that, the veneer care related with its daily use, such as avoiding eating hard foods and chewing excessive burden, also needs to be informed to the patient. The patient is then asked to come to control a week later, and to have regular control every 6 months. With these recommended procedures, a good prognosis for long-term can be expected to be obtained.

It can be concluded that the indirect porcelain veneer is an alternative treatment that can conservatively improve the aesthetic appearance by taking the enamel tissue as little as possible and leaving the healthy tooth tissue as much as possible. It can give better color reproduction and more natural form of teeth, get the optimal tooth function, including the optimal protection of tooth supporting tissues. In other words, the indirect veneer is an effective treatment that can improve the appearance of the patient.

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