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Clinical Evaluation Of Indirect Composite Veneers In Human Teeth

Ruchi Gupta, Asit Vats, Dipasha Sharma
Professor, Dept Of Conservative Dentistry And Endodontics, Divya Jyoti College Of Dental Sciences And Research, Modinagar, Ghaziabad
Professor And Head, Dept Of Conservative Dentistry And Endodontics, Divya Jyoti College Of Dental Sciences And Research, Modinagar, Ghaziabad
PG Student, Dept Of Conservative Dentistry And Endodontics, Divya Jyoti College Of Dental Sciences And Research, Modinagar, Ghaziabad

Abstract
Dental discoloration often presents as an aesthetic challenge due to intrinsic discolorations, surface irregularities and compromised enamel translucency. Treatment requires a balance between preparation techniques and the achievement of optimal aesthetic outcomes. While ceramic veneers are regarded as the gold standard for masking severe discolorations, their preparation often necessitates more aggressive tooth reduction and higher financial cost, which may not always be ideal for young patients or those seeking conservative and economical solutions. In recent years, ***indirect composite veneers*** *have emerged as a viable alternative. They combine the advantages of minimally invasive tooth preparation, improved aesthetics, chairside adjustability, and reparability compared to ceramics. In the present article, indirect veneers fabricated with* ***Ceramage (Shofu)*** *demonstrated excellent shade-matching, surface gloss, and ability to effectively mask the underlying stains.*

Key Words: *Veneer, Discoloration, Indirect restoration, Ceramage, Composite*

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I. Introduction

In the contemporary era, patients aspire to attain a well-balanced and healthy tooth structure, coupled with an aesthetically pleasing smile. This has underscored the importance of incorporating considerations for both function and form in the field of dentistry, emphasizing the restoration of natural dental aesthetics. Consequently, conservative treatments, aiming to full-fill patients' expectations, have become the preferred initial approach to treatment. Among these conservative options, veneers stand out as an exceptionally aesthetically pleasing method to enhance smiles, providing a more pleasing and beautiful appearance[1.]

Teeth might be prepared minimally or not at all before veneer placement. This is particularly true for procedures such as diastema closures and toothform modifications. Nevertheless, when extending the incisal edge, preparation is often necessary. Composite veneers placed on unprepared enamel are termed extra-enamel restorations as they are situated outside the enamel boundaries. On the other hand, intra-enamel preparations involve all margins within the enamel confines. Dentin–enamel preparations encompass both dentin and enamel cavosurface margins[2].

For a long time, composite veneers utilized to treat front dentition in a conservative and visually acceptable manner. It is not advisable to utilize veneers on teeth with severe misalignment, extensive prior restorations, notable parafunctional activity, substantial vertical overlap in the anterior region without horizontal overlap, or the presence of soft-tissue pathology. Currently, veneers are typically crafted from ceramics and composite resins. While ceramics offer commendable wear resistance, colour stability, a sleek surface, and excellent aesthetics, they possess inherent brittleness and can be abrasive against the natural tooth structure that opposes them.[3]Contemporary composite resins exhibit favourable aesthetic and physical characteristics, are user-friendly, don't demand complex equipment, and offer a cost-effective treatment option suitable for individuals across various age groups.

There are two major categories of veneers, indirect and direct, and many variations within each category.

Indirect veneers, crafted outside the oral cavity and are bonded into place with a free-flowing composite resin. These veneers are of two types: prefabricated or custom-made. The initial forms were prefabricated acrylic systems, while contemporary custom systems are constructed from either composite or porcelain.

Direct veneers are made directly within the oral cavity, typically using one or more layers of light-cured composite. These types of veneers, particularly those made of direct composite, have experienced significant growth in popularity in recent times. They prove to be particularly beneficial for younger patients, including

children and adolescents, and have also gained popularity as a cosmetic enhancement in adult patient care. Direct veneers offer several advantages, including minimal tooth preparation and the absence of the need for laboratory procedures. Moreover, the method is flexible, affording the dentist full control over every facet of the process. However, drawbacks associated with direct veneers include prolonged chairtime during placement and the inherent physical constraints of direct restorative materials. These limitations contributed to the relatively brief lifespan of around 4 to 8 years for the average composite veneer, a duration deemed comparatively short in comparison to alternative restorative treatments.

Although composite veneers are carried out using a direct method. There is a resurgence fascination in the direct–indirect composite veneer procedure in an account of its benefits, versatile applicability for restoring adult teeth colour and anatomy.

By layering certain composites onto the tooth in a step-by-step manner without the need of a bonding agent, direct-indirect composite veneer method is attained. They have been moulded into an initial anatomical shape with small extra material and then light cured[4.] Subsequently, the partly polymerized veneer is removed from the teeth, undergoes high temperature, and is finished to achieve the final morphology. It is then processed outside the mouth before cemented. This method's advantages include superior finishing and polishing, unparalleled marginal adaptability, better physical and mechanical qualities resulting from the tempering process, and the chance to test the veneer before cementing it. This enables a process of shade matching and correction that is not possible when using the direct technique. Additionally, the direct–indirect method contributes to improve gums health with patient comfort.[5-7]

By combining remarkable aesthetics, high mechanical characteristics, and long-term colour stability with the least amount of abrasion to the opposing teeth, CERAMAGE has achieved a significant advancement in indirect resin technology and continuously exceeded the expectations of the dental team. In order to provide a long-lasting surface quality with high plaque resistance and excellent polish. This makes it perfect for metal-supported, metal-free anterior and back tooth restorations. Known for its ceramic-like image, Ceramage exhibits life-like aesthetic and exceptional translucency while its comprehensive shade spectrum enables the stimulation of a wide range of surface textures and translucencies, as distinct as those visible in the natural dentition and gingiva.[8]

BRILLIANT NEXT GENERATION (NG) is a composite designed to streamline the application technique and achieve outstanding aesthetic outcomes. The pre-polymerised particle filling, combined with a substantial nanometric particle content, ensures an ideal consistency for manipulation and modelling while significantly reducing shrinkage and facilitating the creation of high gloss surfaces. With its duo shade system, the composite can yield two shades from a single syringe, making the colour selection process and syringe inventory more straightforward. Owing to its optimized particle distribution, Brilliant NG is suitable for use in both the demanding aesthetic requirements of the anterior region, where polish and finish are crucial, and the posterior region, where exceptional resistance to the forces of chewing and abrasion is necessary. It has a pliable and easily mouldable yet non-sticky consistency, allowing for straightforward polishing. The inclusion of pre-polymerized particles contributes to minimizing shrinkage.[9]

There is a lack of clinical studies including recent aesthetic composite veneer i.e. Ceramage and Brilliant NG. This article is an attempt to evaluate recent aesthetic composite veneer clinically. Comprehensive in vivo tests are necessary, as with any novel method, to determine the final clinical effectiveness of these aesthetic restorations. From this we are expecting a good outcome.

II. Methodology

Tooth preparation

The first step in preparing teeth for veneers was to use a depth cutting bur (DM-305, Mani, Japan), to establish 0.5 mm depth orientation grooves from the cervical to the incisal edge, without reducing the incisal length. A tapered round-end diamond bur (TR-12, Mani) was used to remove a uniform thickness of facial enamel by joining the depth orientation grooves. The tooth preparation was finished and smoothened using a tapered round-end diamond bur of extra fine grit (TR-13EF, Mani). This was done to avoid any areas of stress concentration within the tooth preparation.

Composite veneer build-up

An impression of the tooth preparation was made using polyvinylsiloxane impression material. As per ISO 4823, light body/type 3 (Express XT, 3M ESPE) was used to achieve accurate detail reproduction of the tooth preparation margins, and putty/Type 0 (Soft Putty, 3M ESPE) was used to complete the impression of the tooth. It was then cast using die stone (Kalrock, Kalabhai Karson Pvt Ltd, India). Once the cast was attained, a single layer of die spacer (Ceramage Spacer, Shofu) was applied to the tooth preparation. It dries in 1-2 minutes and forms a silicone-like layer to provide space for the luting agent. Following this, a layer of separating medium (Ceramage Sep, Shofu) was applied, avoiding the margin region. This helps with isolation and facilitates the

removal of the veneer from the cast. The veneer was then built up on the cast using IC resin (Ceramage, Shofu), and its thickness was verified. It was cured in the light cure unit (bre. Lux Power Unit 2, Bredent, UK) for 3 min. Etching and bonding of the tooth substrate were performed. After the completion of the cure, the IC veneer was removed from the cast and luted onto the tooth using a light-cured composite luting agent (Calibra Veneer Esthetic Resin Cement, Dentsply Sirona). The luting agent was tack cured for 2 s to facilitate the removal of excess resin, then cured for 20 s.

III. Discussion

Dental fluorosis often presents as an aesthetic challenge due to intrinsic discolorations, surface irregularities, and compromised enamel translucency. Management requires a balance between minimally invasive techniques and the achievement of optimal aesthetic outcomes.[10-12] While ceramic veneers are regarded as the gold standard for masking severe discolorations, their preparation often necessitates more aggressive tooth reduction and higher financial cost, which may not always be ideal for young patients or those seeking conservative and economical solutions.[13-14]

In recent years, **indirect composite veneers** have emerged as a viable alternative. They combine the advantages of minimally invasive tooth preparation, improved aesthetics, chairside adjustability, and reparability compared to ceramics. In the present case, indirect veneers fabricated with **Ceramage (Shofu)** demonstrated excellent shade-matching, surface gloss, and ability to effectively mask the underlying fluorotic stains.[15]

Compared with direct composite veneers, indirect restorations provide superior control over contour, proximal contacts, and polymerization shrinkage, leading to enhanced marginal integrity and longevity. Furthermore, laboratory polymerization allows for higher degree of conversion and improved mechanical properties, thereby overcoming some limitations of chairside composites.

The final aesthetic result was highly satisfactory. Notably, the outcome was superior to that of Brilliant NG IC veneers, reflecting the material's ability to deliver enhanced optical properties and long-term polish retention. Such results reinforce the clinical applicability of indirect composite veneers as a predictable, conservative, and cost-effective modality for managing fluorosis-related aesthetic concerns

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