

LAMINATE VENEERS- A MINIMALLY INVASIVE ESTHETIC RESTORATIONS**Dr. Nitika Gupta*¹, Dr. Kritika Gupta²**¹Postgraduate Student, Department of Prosthodontics, Crown and Bridge & Implantology, Himachal Institute of Dental Sciences, Paonta Sahib.²Senior Lecturer, Department of Pedodontics and Preventive Dentistry, Himachal Institute of Dental Sciences, Paonta Sahib.***Corresponding Author: Dr. Nitika Gupta**

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ABSTRACT

Veneer is one of the most revolutionary techniques developed over the past 25 years. Laminate veneers are a conservative and durable treatment modality of unesthetic anterior teeth. An insight has been given on indications, contraindications, steps of fabrication, failures and advances in veneers in this article.

KEYWORDS: porcelain veneers, esthetics, minimally invasive.**INTRODUCTION**

Beauty of smile and aesthetics of anterior teeth are considered synonymous. Any change in morphology or colour in relation to anterior teeth invites careful intervention of prosthodontic treatment. In earlier days, the treatment of beautification involved invasive procedures like crowns. With the increase in public demand for the treatment of unaesthetic anterior teeth, awareness on preserving the biology of the tooth has also increased and hence minimally invasive esthetic procedures have gained momentum. Veneer according to Sturdevant^[1] is defined as a layer of tooth coloured material that is applied to a tooth to restore localized or generalized defects and intrinsic discolourations.^[1] The term veneer is used interchangeably with laminate but in laminates the overall shape is not changed.

Veneers were introduced in 1928 by Dr Charles Pincus, a Californian dentist. In early 1960, Dr Rafael Bowen introduced the first effective resin-based dental composite. In 1970, light cured composites were introduced.^{[2][3]} In 1975, Rochette introduced the concept of acid etching of porcelain and bonding it to the tooth.^{[2][3]} This made porcelain, one of the most popular and attractive materials in the dental armamentarium.^[4] In 1982, Horn and Calamia introduced the concept of bonding acid etched porcelain veneers to etched enamel which improved the bonding of veneer and made it more durable. Then in 1984, Simonsen and Calamia treated etched veneer surface with organo functional silane coupling agents which further increased the bond strength. Recently, ultrathin porcelain veneers have been introduced which involve minimal or no removal of any tooth structure. Prefabricated veneers like componeers

which use nano hybrid composite have also been introduced.

If all the guidelines for veneers are followed from case selection to the placement of veneers along with incorporation of the smile design principles, veneers offer a prosthetic restoration that best compiles the principles of present day esthetic dentistry. This "substitute enamel" now brings us closer to achieving the goals of prosthodontics; to replace human enamel to its proper structure, shape and colour with this "bonded artificial enamel".

INDICATIONS

Veneers are used as a conservative solution to an aesthetic problem. They can be used in a variety of clinical situations such as:

- 1) Masking of discolouration (Fig.1 and Fig. 2)
- 2) Repair of defects (Fig.3-6)
- 3) Intermediate restoration

**Fig. 1: Tetracycline stained teeth due to non vitality.**



Fig. 2: Staining in right central incisor.



Fig. 5: Mild malalignment.



Fig. 3: Diastema.



Fig. 6: Chipped incisal edges.



Fig. 4: Peg shaped laterals.

➤ Indications For Porcelain Laminate Veneer

Pascal Magne and Belser in 2002 divided the indications for porcelain veneers into three principal groups.^{[3][5][6]}

Type 1 – Tooth discolouration resistant to bleaching procedure

- 1A - tetracycline discolouration of degree iii and iv
- 1B – no response to external or internal bleaching

Type 2 – Need for major morphologic modification in anterior teeth

- 2A – conoid teeth
- 2B – diastema and interdental triangles to be closed
- 2C – augmentation of incisal length and prominence

Type 3 – Extensive restoration of compromised anterior teeth

- 3A – extensive coronal fracture
- 3B – extensive loss of enamel by resorption and wear
- 3C – generalized congenital and and acquired malformations

➤ Contraindications For Veneers

Teeth that need strengthening
Teeth with little enamel
Excessive forces
Moderate to severe malposition or crowding

➤ Veneer Versus Other Treatment Modalities^[7]

Treatment Approach	Usual procedures
Non-invasive	Bleaching, microabrasion, Orthodontics
Minimally-invasive	Direct composites, enamel Recontouring
Micro-invasive	Veneers, inlays and onlays
Macro-invasive	Crowns and bridges

➤ Fabrication Techniques

The laboratory techniques for fabrication of porcelain veneers are

1. Refractory investment technique
2. The platinum foil technique
3. Pressed porcelain veneers
4. Milling systems- CAD/CAM and copy milling

❖ Pressed Ceramics^[6]

Veneers can be made by utilizing a technique similar to the lost wax technique. They are fabricated by waxing up the tooth to a desired contour, investing it and melting out the wax. A glass ceramic ingot of the desired shade is plasticized at 920 degree C at which they become highly viscous liquid and pressed into the investment mold under vacuum and pressure. Pressure is used for providing additional material as the porcelain cools and shrinks.

This method results in a very dense ceramic material having high flexural and compressive strength.

❖ Cad/Cam Technology^{[8][9][10]}

This system has evolved over the last two decades. Veneers made by this technique are easier to fabricate present with good mechanical strength because they are manufactured under precise controlled conditions diminishing potential inaccuracies resulting from manual fabrication procedures.

➤ Preparation Design For Porcelain Veneers

A key element for the success of porcelain veneers is the controlled and appropriate tooth reduction. Various factors that influence the amount of tooth preparation are patients expectations, midline position, lip position and fullness, incisal edge position, desired teeth shapes and contours, occlusion, desired colours.^[11] Four basic preparation designs are Window, feather, incisal overlap and butt joint design.

1. Incisal overlap (Fig.7): In this design, the incisal edge is reduced and the veneer preparation extends onto the palatal tooth surface with light palatal chamfer 0.5 mm wide, terminating 1mm far away from central contact points, not involving the palatal

concavity. This design is given in cases where it is necessary to

- Lengthen the tooth
- Where part of the palatal surface needs protection
- When the incisal thickness is too thin
- Where the incisal edge is poor aesthetically due to minor chipping

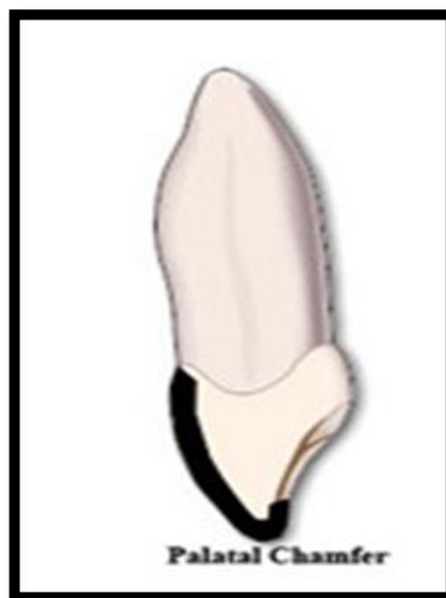


Fig. 7: Incisal overlap design.

- 2) Butt joint (Fig. 8): It is created by cutting the incisal surface i.e. edge flat without forming the palatal chamfer. It provides two paths of insertion i.e. bucco-palatal and inciso-cervical. It is given for:
 - Moderate crown fracture that involves incisal one third
 - In severe wear it is recommended to make butt margin as it limits the extension of the ceramic and reduce the amount of stress at tooth/veneer interface.



Fig. 8: Butt joint design.

➤ CEMENTATION

- Veneer is treated with hydrofluoric acid for increasing the surface area for bonding leading to a

micro mechanical interlocking of the resin composite.

- The period of acid conditioning varies according to the ceramic material.^{[12][13]}

CERAMIC	CONDITIONING
Feldspathic	9.5% HF for 2 to 2.5 min, 1 min washing, silane application
Leucite reinforced	9.5% HF for 60 sec, 1 min washing, silane application
Lithium disilicate reinforced	9.5% HF for 20 sec, 1 min washing, silane application

- Thereafter, silane coupling agent is applied on the veneer surface which increases the bond strength. Then, acid etching of the tooth is done with 37% phosphoric acid for 30 seconds. The etchant must reach the entire periphery of the preparation. At this stage, contamination with saliva must be avoided. Then rinsing with copious amount of water for 20 seconds is done. Bonding agent is then applied onto the surface, gently air dispersed and polymerized. For cementation, a light cure luting composite resin cement is preferred as it allows a longer working time compared with dual cure or chemically cured resins.

But, it is important that enough light transmittance throughout the porcelain veneer should be there to polymerize the light curing luting composite. This light transmittance is affected by the thickness of the porcelain veneer. Therefore, dual cured luting resins should be used in cases when the thickness of the ceramic is more than 0.7mm as their light cure resins do not reach their maximum hardness in such cases. Example: Rely XTM by 3M ESPE, Variolink Veneer by Ivoclar Vivadent, Choice™ 2 light cure cement by Bisco, Panavia™ dual cured cement, Insure Universal Cementation System™ from Cosmedent.

➤ Failure And Repair Of Veneers

- The most frequent failure factors associated with veneers are fracture and debonding. Fracture of laminate veneers represent 67% of the total failures of such restorations.

❖ CAUSES OF FAILURE OF LAMINATE VENEERS.^[14]

1. Case selection
2. Tooth preparation
3. Laboratory processes
4. Try in and handling
5. Choice of cement
6. Bonding procedures

❖ Failure can also be classified as

1) Mechanical

Fracture: Poor positioning of incisal margin
Less incisal thickness

Debonding: Use of expired cement
Faulty luting procedure

2) Biological - Postoperative sensitivity: Improper curing of cement

Marginal microleakage: Poor fit and extension

- 3) Aesthetic factors Improper shade selection
Visible margins in case of discoloured teeth
Gingival recession due to overcontour

➤ RECENT ADVANCES

PREPARATION LESS VENEERS/ ultrathin porcelain veneers^[15]- involve minimal or no removal of any tooth structure. Veneer thickness can be as thin as 0.2 to 0.3mm.

- a) Lumineers (Fig.9)
- b) Vivaneer
- c) DURAthine® veneers
- d) MAC veneers (Micro Advanced Cosmetic Division Veneers)



Fig. 9: Preop & postoperative case of discolouration treated by lumineers.

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