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Veneers in Esthetic Dentistry

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Abstract
Veneers are conservative treatment options forunaesthetic anterior teeth. The progressive developments in the field of dental ceramics offers various options for the clinicians to create high aesthetic and functional veneers. The evolution of materials and various adhesive systems permits improvement of the patient smile and confidence of the patient. Clinicians should have complete knowledge of latest ceramic materials, their indications which will determine the success of veneers. The current article was reviewed for various parameters determining the long-term success, correct indication, and clinical limitations of veneers.

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I. Introduction

Veneers werefirst described in 1940 by Dr. Charles Pincus, and at present they are one of the most opted conservative restorations for unaesthetic anterior teeth. Acid etching of enamel,ceramic and composite resin technology were required for the desired treatment outcome with veneers.[1]Although, composite resins have certain limitations such as staining and poor wear resistance, polymerization shrinkage, thermal dimensional changes, and as a veneer they havea limited life of 4 years or less.On the other hand, veneers in ceramic materials have excellent clinical outcome both aesthetically and clinically more conservative treatment modality. For the same reason,ceramic veneers given to enhance patient's smile in minimally invasive to virtually non-invasive way in both as a material choice as well as the technique.[2]Etched ceramic veneer restoration has proven to be a durable and aesthetic modality of treatment. The clinical success for the ceramic veneer technique success has been attributed to detail inplanning the case, with the correct indications; minimally invasive preparation of the teeth; proper selection of type ceramic to be used; ideal selection of the materials and methods for cementation; and proper planning for the maintenanceof these restorations by the patient and dentist both.[3]The purpose of this article is to review the current literature and to present the important aspects such as patient selection criteria, shade selection, various tooth preparation methods, cementation of the veneers for determining the long-term success of veneers.

Patient Selection Criteria
The first important criteria for the long term success of veneer isthe case selection.[4]

The **Indications** of dental veneersinclude:
1) Sound enamel and good oral hygiene
2) Discoloured teeth due to many etiological factors such as tetracycline staining,fluorosis, amelogenesisimperfecta, age and others.[5]
3) Restoration of fractured andworn out teeth.[4]
4) Abnormal tooth morphology like peg laterals.
5)Correction of minor malpositioned teeth.

Contraindications
1) Patients with parafunctional habits such as bruxism.[6]
2) Edge to Edge tooth relation.
3) Poor oral hygiene and if patient is periodontally compromised.
4) Insufficient enamel.

Shade Selection Procedure
The next important clinical criteria which determines the long term success ofporcelain veneer is the shade selection procedure. Proper shade selection is notonly with matching the shade using shade guide, but there

should be properconsideration of hue, value and chroma and proper lighting.[7] Some of the methods for shade selections are as follows:

- To avoid color fatigue shade matching must be carried out in early hours of appointment.
- Shade matching should be done in neutral color cover background so, if patient is wearing any bright clothes they should be covered with neutral colour drape.
- Cleaning and polishing of the teeth is mandatory.
- Patient's mouth should be at dentist's eye level.
- Shade comparisons should be performed at 5 sec interval so as not to fatigueeyes.
- When there is any confusion between the two shades then it is always better to select a shade of lower chroma and higher value.

Tooth Preparation Designs and Influence on Success of Veneers

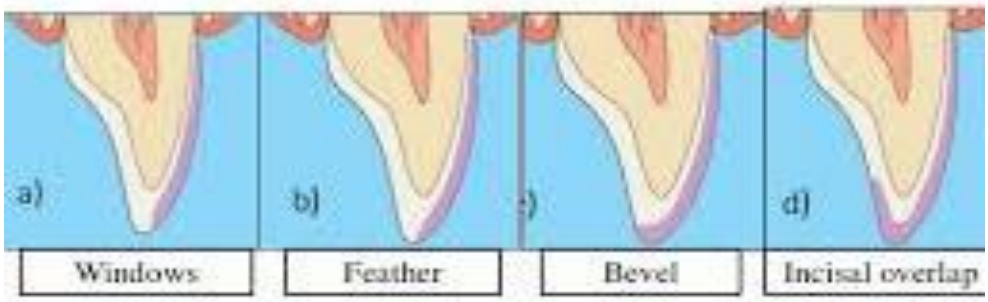
There are four different designs of teeth preparation commonly used:

1) **Window Preparation**: in this preparation the incisal edge of the tooth is preserved.

2) **Feather Preparation**: in this preparation the incisal edge of the tooth is prepared Bucco-palatable, but the incisallength is not reduced.

3) **Bevel Preparation**: in this preparation the incisal edge of the tooth is prepared Bucco-palatable, and the length of the incisal edge is reduced slightly (0.5-1 mm).

4) **Incisal Overlap Preparation**: in this preparation the incisal edge of the tooth is prepared Bucco-palatable, and the length is reduced (about 2 mm), so the veneer is extended to the palatal aspect of the tooth.[8,9,10,11]



Concepts Regarding Design Preparations

General Concepts

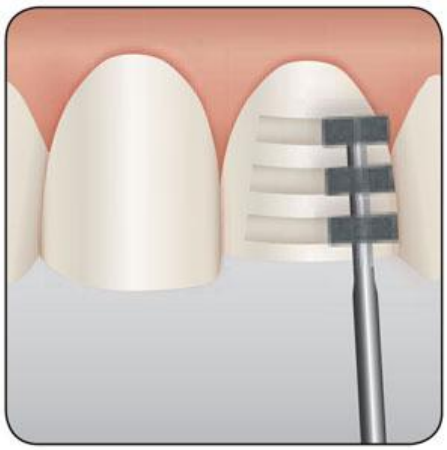
In above mentioned preparation designs, few are recommended in the majority of literature and clinical studies.

- ✓ For more durable results, the preparation should be restricted upto theenamel surface only as it is considered to be a majorfactor for a favourable bonding strength.[12,13,14]
- ✓ The interproximal contactpreservation is recommendedin most of the literature and clinical data, as it willpreserve more enamel and tooth structure i.e. a more conservative approach, as it will allow positive seat for cementation.[15,16]
- ✓ However, in certain situations such as malaligned teeth or diastema theinterproximal contact is removed for better aesthetic results.[17,18]
- ✓ The amount of labial reductionsynchronous at 0.4-0.7 mm for ceramic veneers.[19,20]This is due to difference in the enamel thickness ofanterior teeth.
- ✓ As study conducted by Ferrari et al., (1991) [20],the enamel thickness of 114 extracted anterior teethwas 1.0 to 2.1 mm at the incisal third, 0.6 to 1.0 mm atthe middle third and 0.3 to 0.5 at the gingival third,therefore, minimal preparation is recommended.

Sequence of Tooth Reduction

Labial surface reduction

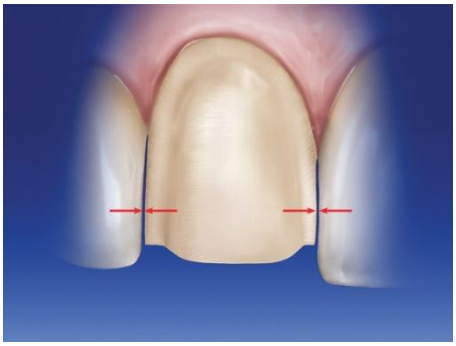
In vitro studies have shown that in tooth preparation the portion of teeth is usually overprepared leading to exposure of dentin and the mid-incisal preparation remains underprepared. So, to overcome this problem different designs of depth-control cutting diamonds should be used for accurate veneer preparation. The cutting instrument is placed in two to three different planes along the convex labial surface of the tooth. Now, three horizontal surface depth cuts are prepared on the labial tooth surface with the respective three tired depth cutting diamond as shown in the figure.



Labial surface is prepared upto(0.4-0.7 mm)of thickness into the enamel by using the depth cuts. Pencil lines can be marked into the enamel guide grooves. In various studies, chamfer finish line is recommended whichis placed at the height of gingival crest(supragingival margin) unless there is severe tooth discoloration.Supragingivalfnishline are preferred as they are easy to maintain by the patient, increase the area for better cementation, isolation is better, good accessibility.

Proximal Reduction

The preparation will be extended bucco-lingually only in diastema or peg lateral incisors otherwise the contact area should be preserved as shown in the picture below.



IncisalReduction

As there are different design preparations for veneers so it is not mandatory to include the incisal edge of the tooth.[21] In certain studies,incisal coverage is necessary such as to enhance the mechanical resistance of veneer, even though this involve the removal of 0.5-2.0 mm of the intact incisal edge. Other authors have suggested incorporating the incisal edge into the preparation only when required esthetically or occlusally.[22]

It is proven that incisal overlap preparationprovides the best support for the restoration and distributes occlusal load over a larger surface area.While, in the window preparation, the occlusal stress ishighly concentrated on the incisal third which might lead to fracture of the restoration.Incisaltranslucency can be better achieved when the incisaledge isreduced.[23, 15]

Bonding Protocol

There are three basic ways of attaching veneers to the tooth surface.

- Chemical attachment
- Micromechanical attachment
- Combined attachment

Dune and Millar reported in their study that the clinical durabilityof ceramic veneer is more related to marginal adaptation. [24,25]Hence, cementation(bonding between tooth and ceramic) is one of the most important parameter for success.

Procedure:

- ✓ The teeth are isolated with rubber dam, polishing is done with pumice paste followed by washing with water spray.
- ✓ The prepared teeth are separated from the adjacent teeth with mylar strips or Teflon tape.
- ✓ Prepared tooth enamel is etched for 15 sec, washed, and then dried. Light-cure bonding agent is applied to etched enamel, scrubbed for 20sec and gently air dry.
- ✓ Ceramic veneer is etched with HF 9.6% for 10 sec and washed with water then Silane coupling agent is applied for 1-3 min on veneer suface.
- ✓ The selected shade of cement is placed evenly on the veneer surface, tack cured, excess flash is removed and then cured for 60 sec.

After curing the excess cement should be removed with fine, water-cooled diamond and interproximal clearances confirmed with separating strips and dental floss.Excessive stress on newly placed veneer should be avoided for next 24 h for the coupling agent to develop its maximum bond strength.Materdomini, has reported that veneer estheticscan be enhanced with the contact lens effect concept.[26] According to him, when the veneer is cemented to tooth structure, it should blend optically with the substrate so become difficult to detect. To achieve this effect;two factors must be considered. They are Translucency/opacity of veneer itself and translucency/opacity of luting composite. Either factor can result in high opacity level, especially at the margin, the contact lens effect will not be achieved.

II. Conclusion

The veneers are very esthetic and conservative treatment options. The success of veneer depends most importantly on case selection, design preparation and material being used for the fabrication. As veneers with incisal coverage seem to have better aesthetic and more desirable outcomes.Theresearch in this field has been based on personal preference and clinical outcomes, more research is required so that veneer will become more successful treatment option.

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