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PORCELAIN VENEERS AS AN ALTERNATIVE ESTHETIC APPROACH

Dental Science

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ABSTRACT

Porcelain laminate veneers are one of the most conservative and esthetic restoration that can be used for enhancing esthetics. The current porcelain veneers are esthetically superior, conservative and durable treatment modality. Ceramic veneers can be offered as the treatment option in a variety of cases such as correcting tooth defects, diastema, tooth discoloration, coronal fracture or to adjust occlusion.

KEYWORDS

CAD, CAM, Resin composite

INTRODUCTION

In recent times patient's demand for aesthetic treatment has increased rapidly. Advancements in the field of aesthetic dentistry has offered an affordable and quality treatment options to improve smiles, thereby providing patients with the satisfaction and confidence they seek. With various treatment options missing teeth can be replaced, broken teeth can be repaired, and also the shape and size of unpleasant looking teeth can be improved.

In the past aesthetic correction of anterior teeth was mainly achieved by preparation of full ceramic crowns, which was considered the most enduring and predictable treatment option.[1] However, this method is certainly the most invasive aesthetic treatment option, as it leads to considerable loss of sound tooth structure and has potential detrimental effects on the adjacent pulpal and periodontal tissues. Recently, with the advancement in adhesive dentistry, conservation of tooth structure is feasible while attaining the restorative needs and aesthetic desires of patients.[2]

Aesthetic restoration of anterior teeth is considered as one of the greatest challenges in restorative dentistry, and in these circumstances porcelain veneers have become a popular treatment option.[3] They can be used to correct or improve the morphology of tooth in relation to shape, size, colour, contour, volume, and position.[4]

Porcelain veneers have proven to be a durable aesthetic treatment alternative to full ceramic crowns since their introduction in the field of aesthetic dentistry.[5]

In recent years with the tremendous advancements in dental adhesive systems, bonding to enamel and dentin has become more predictable and promising. Thereby more conservative restorative techniques have become possible for treatment of unaesthetic teeth.[6]

Resin composite restorations can also be used for correction of tooth shape, size and to mask tooth discolorations. However, these restorations have limited longevity and tend to discolour over the time, thereby reducing the aesthetic treatment outcome.[1] Porcelain veneers have superior colour stability and aesthetics.

The technique for porcelain veneers involve minimal tooth preparation and bonding of a thin porcelain laminate to the tooth surface by using dental adhesive bonding systems and a luting resin composite material. The success of porcelain veneers is significantly influenced by the strength and durability of the bond between the three dissimilar components of the bonded veneer complex, i.e., the tooth surface, the luting resin composite and the porcelain veneer.[1]

Two types of porcelain materials are indicated for veneers:
- Sintered feldspathic porcelain
- Pressable ceramic.

These materials have superior aesthetics properties like translucency and can be used in small thickness without compromising the strength. They can also be milled using computer-aided designing/ computer-aided manufacturing technique (CAD/CAM).[7]

Various clinical studies have confirmed the clinical performance of these veneers, as they have superior aesthetics with high patient satisfaction and no adverse effects on gingival health.[3,8] Most of the authors reported a low failure rate (almost 0% to 7%).

Therefore, porcelain veneers are considered more enduring than direct composite veneers, depending on the clinical demand, occlusion, preparation of the tooth surface and adhesive system used.

Indications

- Discoloured anterior teeth which are non-responsive to vital bleaching procedures.
- Disagreeable shapes, contours and/or insufficient size and/or volume.
- Any need for modification in morphology of the teeth (for example, closure of midline diastema, minor changes in tooth alignment, fluorosis with enamel mottling, restoration of localized enamel malformations, teeth with minor chipping and fractures, and misshapen teeth).[3]

Contraindications

- Reduced inter-occlusal distance
- Deep bite
- Severe bruxism, or any other parafunctional activity.[9]

DISCUSSION

In recent times, due to high aesthetic demands, porcelain veneers are considered as a routine treatment option for unaesthetic anterior teeth. Aesthetic rehabilitation with porcelain veneers is a way to preserve sound tooth structure, especially in young patients with high aesthetic demands. Porcelain laminate veneers are considered the most conservative, aesthetic, and cost-effective treatment option, especially in cases where there are no occlusal discrepancies.[10]

Porcelain veneers are usually fabricated from low fusing conventional feldspathic porcelain. There are primarily two techniques for fabrication of porcelain veneers.

1. Platinum foil technique
2. Refractory die technique.[1] (most preferred technique)

The inner side of the porcelain veneer is etched by hydrofluoric acid and later this etched surface is silanized by using a silane coupling agent. The bond strength of etched porcelain to a luting resin cement is much higher as compared to the bond strength of etched enamel to a luting resin cement.[11] By etching of the inner side of veneer with hydrofluoric acid(HF) produces an etch pattern which helps in retention. SEM analysis of this etched porcelain surface shows a micro-structure with various porosities.[12] The surface area for bonding increases due to these micro-porosities and thereby, leading to formation of a micro-mechanical interlocking of the resin composite. Various factors like the duration of etching, concentration of the etchant, fabrication method of the porcelain veneer, and type of porcelain used for fabrication determines the etch patternand subsequently the bond strength of the resin composite to the etched porcelain surface.[13]

According to Meijering et al.[14] the veneer's survival rates were almost 94% for porcelain veneers, 90% for indirect composite veneers, and almost 74% for direct composite veneer type of restorations. Some other studies have established that the survival rate for porcelain laminate veneer restorations is greater than 90% over 10 years of clinical service.[15] A study done by Della Bona and Kelly et al. (2008),[16] compared clinical evidence for all ceramic restorations and reported that porcelain are well suited for veneer restorations and have a very low failure rates (including loss of retention or fracture) of almost less than 5% at five years of time interval. Few other researchers found that the feldspathic type of porcelains showed similar long-term survival rates at different time intervals: 96% at five years, 93% at 10 years, and 91% at 12 years.[16]

Presently, computer-aided design/computer-aided manufacturing (CAD/CAM) systems make the fabrication of veneers a lot easier as compared to traditional fabrication methods. CAD/CAM veneers have a real life, natural appearance because the ceramic blocks used for milling have a translucent quality that imitates enamel and they are also available in a wide variety of shades.[17] The success rates are almost 98.8% high as compared to conventional veneers.[18] The best part of CAD/CAM fabricated veneers are that the quality of ceramic material is consistent as the prefabricated ceramic blocks are free from any internal defects and the computer software is well designed to produce customized size and shapes that will stand up to any wear due to occlusion.[17]

Clinician should be able to assess the choice of material, fabrication method and type of luting cement on the requirements of the tooth being restored to improve its aesthetics and function. The clinical success of laminate veneers majorly depends on the cementation procedure of the indirect restorations.[19] As the ceramics are brittle in nature, adhesive cements are used to improve their fracture resistance property by penetrating in the flaws and irregularities present on the internal surfaces and thus minimizing propagation of cracks and thereby allowing a more effective stress distribution from the restoration to the supporting tooth structure.[20] However, the cementation technique of adhesive cement is highly technique sensitive and also associated with a high incidence of postoperative sensitivity.

Conclusion

Porcelain veneers are indicated in cases of teeth needing alterations in colour and shape and with extensive restorations. This treatment presents advantages, such as a minimum thickness of tooth reduction, bonding between ceramic and enamel and dentin, and a satisfactory aesthetic result due to the inherent properties of the ceramics.

Currently, the properties of ceramics indicate that they are the materials which are capable of mimicking human enamel and also their mechanical properties are expanding their clinical applications. Therefore, it is possible to conclude that the clinical success of laminate veneers depends on both the suitable indications of the patient and the correct application of the materials and techniques available for that, in accordance with the necessity and goals of the aesthetic treatment.

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