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ORIGINAL ARTICLE

Success of Veneers with Indirect Resin Composite

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ABSTRACT

Objective: To evaluate the success of veneers fabricated with indirect resin composite (Ceramage).

Method: This Descriptive Case Series was completed at de' Montmorency college of dentistry/Punjab Dental Hospital, Lahore over the period of 6 months from Jul 2018 to Jan 2019. Patients fulfilling the inclusion criteria of the study were selected. After the informed consent, pre-operative radiographs of the teeth to be veneered were taken to rule out any caries activity or periapical pathology. A total of 60 veneers were fabricated with indirect resin composite. Patients were followed up with 6 months interval and restorations were evaluated for complications like dislodgment, chipping, fracture, sensitivity and bleeding from gums.

Results: Out of total of 60 veneers 50 were successful and 10 were unsuccessful. only 4 showed slight postoperative sensitivity,4 showed moderate postoperative sensitivity and 2 showed severe postoperative sensitivity.out of total 5 showed minor crack lines,3 showed minor chipping (1/4 of the restoration) and 2 showed moderate chipping (1/2 of restoration). Success rate of veneers fabricated with indirect resin composite (Ceramage) was 83.3%.

Conclusions: The indirect veneers have undergone considerable improvement and refinement over the past few decades and have now matured into a predictable restorative concept in terms of longevity, periodontal response and patient satisfaction. The design of the restoration should take the material properties into account in order to enhance the clinical performance.

Key words: Indirect Resin Composite, Veneers, Smile makeover

INTRODUCTION

Fractured, malformed and discoloured teeth have always been a major challenge for dentists especially after the popularity of aesthetic dentistry [1][2][3]. The era of aesthetic dentistry began three decades ago and is rapidly evolving since then as newer materials and techniques being introduced every day. Aesthetic restorations are indicated for dental deformities like peg shaped lateral incisors, enamel hypoplasia, fluorosis, ragged gum lines, dental erosion, chips/cracks spaced teeth and also for smile makeovers. Methods to improve dental aesthetics include full coverage crowns and direct and indirect veneers. The former is considered are considered highly destructive as they can compromise sound tooth structure which can later be detrimental to the health. Rapidly growing interest in aesthetic and conservative dentistry led to the widespread use of the veneering system [4]. A veneer is a thin coating of tooth-coloured material that is applied and bonded to a tooth for aesthetically restoring stained, malposed, uneven, spaced teeth as well as teeth with gaps in them.[5][6] Typically, veneers are made of chairside composite, processed composite, porcelain, or cast ceramic materials. Moreover, based on methods of fabrication, there are either direct or indirect veneers; with indirect veneers having more advantages over the other [7][8].

Success of veneers depends on case selection, preparation design, material of fabrication, cementation technique as well as patients' oral hygiene status and compliance [4]. Moreover, fewer complete clinical trials are available that investigated the survival rate of dental veneers according to preparation designs [9]. The strong adhesion complex between veneer, luting cement and enamel is a great advantage of porcelain veneers. Strength of that complex is reported to be around 63 MPa with a bond strength of 31 MPa between composite and enamel and a bond strength of 33 MPa between composite and porcelain.[10] In addition to that, some in-vitro studies suggested that porcelain veneer-restored extracted teeth showed strength comparable to the original teeth. This explains the low failure rate (0–5%), when parafunctional habits were missing,[11] However, some authors reported that porcelain veneers to composite interface tends to have a higher failure rate rather than enamel to composite interface.[12][7]

Constructing a thin veneer with minimal preparation and bonding it to etched tooth structure is referred to as "laminating", which is a conservative alternative approach, rather than full coverage, to improve the appearance of teeth, especially the anterior teeth, where aesthetics holds prime importance. (Horn HR).[13][14][15] A porcelain laminate veneer is extremely thin preformed shell of porcelain applied directly to tooth structure [16]. In aesthetic dentistry, laminates are not only used to restore the misshaped teeth but to restore the original colour of those teeth, as well as change the original colour of the teeth to impart a more natural look.[17]

Generally, aesthetic satisfaction is a complex subjective process. However, some factors may play an important role in patients' satisfaction such as the durability of the final aesthetic outcome, the required amount of teeth preparation, material type and the cost of the treatment [18][19]. Many clinical studies that evaluated the longevity of porcelain veneers and its association with satisfaction of the treatment, which was found to be in a range of 80-100 %.[20] Other studies have been conducted to evaluate

patients' satisfaction with different material types for veneers. Meijering et al., (1997) compared patients' response to three different types of veneers restorations after two years: feldspathic porcelain, direct composite and indirect composite. Porcelain veneers had the best response from patients (93%) followed by indirect composite veneers (82%) and lastly direct composite veneers (67%) [21][22]. In contrast, no statistical difference between patients' response to composite veneers and porcelain veneers was reported, in a study done by, Nalbandian and Millar in 2009 [23][24].

Perfect smile not only improves confidence and personality but also helps psychologically in improving self-image and enhances self-esteem of the patient. Improvement of smile makes us gratifying and opens door for a new dimension of dental treatment using veneers [25]. The aim of this study was to evaluate the success of veneers fabricated with indirect resin composite (Ceramage).

MATERIALS AND METHOD

This was a descriptive case series study, conducted in the department of operative dentistry, de' Montmorency college of dentistry/Punjab Dental Hospital form July 2018 to January 2019 with the approval of IRB of de 'Montmorency College of Dentistry. The sample size of 60 was estimated with non-probability purposive sampling, at 5% level of significance and 9% margin of error and taking expected frequency of success is 87%.[26]

After taking informed consent, patients fulfilling the inclusion criteria of the study were selected and detailed history was obtained followed by clinical examination of the patient. Pre-operative radiographs of the teeth to be veneered were taken to rule out any caries activity or periapical pathologies. Routines scaling and polishing was achieved before initiating the treatment. Shade was determined using different shade tabs in day light. For preparation ball ended diamond burs (ISO 00 I514 023, diatech) were used. The labial surfaces were axially reduced by 0.3mm to 0.5mm. tapered round ended diamond burs (ISO199 514 018, diatech). In cervical areas, a shallow chamfer finish line (O.5mm) was created till gingival level. Incisal edges were not included in any of the preparation. Final impressions were taken prior to the cementation of temporaries and sent to the laboratory. Temporary veneers were cemented with temporary resin cement.

In the final visit, the temporary veneers were removed, and permanent restoration was tried in by using multi auto mix try in paste and shade was re-checked at this stage. After the try in, the paste was thoroughly removed with water spray and the restoration was dried. Isolation was maintained by Optra Dam. Monobond Plus was applied to the restoration with micro brush and left for 60 seconds. Preparation was cleaned with polishing brush, washed and dried. Multilink Primer A/B was applied on the entire bonding surface and scrubbed for 30 seconds. Multi Automix was dispensed from the auto mix syringe and desired amount was applied directly to the restoration placed in patient's mouth and light cured.

After cementation occlusion was checked in with protrusive, retrusive and lateral movements to check interferences and if found were relieved. Patient was scheduled for follow-up visits up till six months for data collection and evaluation.

The data was collected, and analysis was performed with the statistical software program SPSS 20.0. Mean and standard deviation were evaluated for quantitative variables like age of the patient. Frequency and percentage were calculated for qualitative variables like patient's gender and success of the veneers in terms of fracture and postoperative sensitivity. Effect of modifiers/confounders like age and gender were controlled through post stratification. Post stratification Chi-Square test was applied with P value less than or equal to 0.05.

RESULTS

There were 60 patients in total. It was observed that the minimum age was 18 years and maximum age reported was 35 years with mean age and standard deviation reported to be 26.33 ± 5.43 years as shown in Table 3.

Male patients were 31/60 (51.7%) while female patients were 29/60 (48.3%) as shown in Table 2.

There were 50/60 (83.3%) patients in which the treatment was successful, however, 10/60 (16.7%) patients reported with some type of failure as shown in Table 1.

Presence of postoperative sensitivity i.e., 0 (No symptoms) was 83.3%, 1 (Slight sensitivity) was 6.7%, 2 (Moderate sensitivity) was 6.7% and 3 (Severe) was 3.3% as exhibited in Table 1.

Table 1 Comparison of Postoperative Sensitivity and Fracture of Restoration with Success and Failure of Restoration

Complication	Description	Success (%)	Failure (%)	P-Value
Postoperative sensitivity	0 (No symptoms)	83.3	0	0.001
	1 (Slight sensitivity)	0	6.6	
	2 (Moderate sensitivity)	0	6.6	
	3 (Severe)	0	3.3	
	Total	83.3	16.6	
Fracture of the restoration	0 (No fracture)	83.3	3.3	0.001
	1 (Minor crack lines over restoration)	0	6.6	
	2 Minor chipping of Restoration (1/4 of restoration).	0	5	
	3 Moderate chipping of restoration (1/2 of restoration)	0	1.6	
	4 Severe chipping (3/4 of restoration).	0	0	
	5 Debonding of restoration.	0	0	
	Total	83.3	16.6	

Table 2 Stratification of Gender related to the Success

Gender	Success		Total	p-value
	Yes	No		
Male	25	6	31	0.563
Female	25	4	29	
Total	50	10	60	

Table 3 Stratification of age related to the Success

Group age	Success		Total	p-value
	Yes	No		
< 25 years	21	4	25	0.907
25 years	29	6	35	
Total	50	10	60	

DISCUSSION

The objective of the present study was to evaluate the success of veneers fabricated with indirect resin composite (Ceramage). In present Study the overall success rate was 83.3 percent which was in agreement with the previous studies done worldwide. A previous study conducted to evaluate the short-term survival rate of indirect resin composite and ceramic laminate veneers reported no significant difference between the survival rates of composite and ceramic laminate veneers (Estenia: 87%, IPS Empress Esthetic: 100%; p > 0.05). The overall survival rate however was 93.5%.[1] In that study, veneer preparations with incisal overlap were performed and existing resin composite restorations of good quality were not removed but conditioned using silica coating (CoJet) and salinization (ESPESil) [27][28][29].

Similarly, studies on ceramic indirect restorations have revealed a success rate of approximately 90% after 10 years. Several factors, namely the materials, adhesive cementation and bonding procedures, are relevant in applications of indirect composite restoration.[30][19] Previous study was conducted to test the new resin composite "NECO" (Heraeus Kulzer, GmbH) as a material for indirect restorations clinically showed success and survival rates of 84.8% and 91.6%, respectively, after 3 years of service and evaluation. Cementation with Fuji Plus showed a trend (p = 0.054) toward higher success (93.1%) and survival (100%) rates compared to cementation with 2 bond 2 cement which showed success and survival rates of 81.4 and 87.9% respectively. Restorations on vital teeth resulted in success and survival rates of 86.8 and 95.3% respectively, while restorations on endodontically treated teeth showed success and survival rates of 82.6 and 87.5%. [31][32] These results were in agreement with our study.

In 2013, Motulu Ozcan and colleagues conducted randomized controlled split-mouth clinical trial that evaluated the short-term survival rate of indirect resin composite and ceramic laminate veneers on the maxillary anterior teeth and reported 3 failures in the form of debonding (n = 1) and fracture (n = 2) in the group of resin composite laminate veneers and no significant difference was observed between the survival rates of composite and ceramic laminate veneers [33]. The overall survival rate was 93.5% which was in agreement with our study however present study reported no failure due to debonding, however, minor cracks was the leading of failure in this study.

Today's dentistry requires more conservative treatment options.[34] Therefore, composite laminate veneer restorations, which require minimal removal of tooth structure, are one of the best treatment choices.[18] With the advantages such as only one appointment for the whole treatment time, very low costs compared with the ceramics and no need for long laboratory procedures, direct composite laminate veneers are popular in today's dentistry.[25] However, direct composite laminate restorations have still less resistance against abrasions and fractures compared with indirect composite laminate veneers and ceramic laminates [35] Furthermore, indirect composite laminate veneer restorations due to polymerization outside of the oral cavity, and ceramic laminate veneers due to better colour stability because of being less affected by the fluids of the oral cavity, are superior to direct composite veneers.[36]

CONCLUSION

The indirect veneers have undergone considerable improvement and refinement over the past few decades and have now matured into a predictable restorative concept in terms of longevity, periodontal response and patient satisfaction. Success rate of veneers fabricated with indirect resin composite (Ceramage) was 83.3%. The design of the restoration should take the material properties into account in order to enhance the clinical performance.

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