

Case Report

Minimizing Tooth Preparation with Double Veneers: A Case Report on Two-Axis Insertion

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Abstract: This case report describes the use of a minimally invasive approach to the anterior dentition using feldspathic ceramic veneers with two axes of insertion. It was developed to restore as much of the hard structures of teeth as possible while at the same time giving the best esthetic outcome. Unlike other types of veneers that require extensive changes to the tooth shape due to single-axis placement, the technique presented allows for two axes of insertion. This approach enables minimal preparation and preserves most of the tooth structure. The veneers were applied on both maxillary and mandibular anterior teeth and additional six years follow up did not show any sign of fractures, debonding or marginal degradation hence proving the long-term success of this concept. The case highlights the significance of rigorous bonding sequence and the particularity of the fabrication process to achieve long-term outcome stability of the restorations. This work further confirms the applicability of double veneer technique as a reliable option for patients who desire change in their teeth appearance but without undergoing surgical procedures, but more research needs to be done with respect to its versatility in dentistry.

Keywords: double veneers, feldspathic ceramic, no preparation.

Introduction

One of the major challenges in the current dental treatment is the conservation of hard dental tissues during restoration, mainly in cases when esthetic restoration is required. Conventional techniques may require the removal of majority of dental enamel or dentin that may jeopardize the prognosis of the tooth. Therefore, there is a desire for techniques that encourage the least amount of tooth tissue in removal while simultaneously attaining ideal function and esthetics [1]. A breakthrough in the development of ceramic materials and adhesives has contributed to the better possibilities for conservative restoration. New ideas have appeared, including the usage of the two-veneer technique [2]. Double veneers, where two layers of feldspathic ceramic veneers with different axes of insertion are placed, is a newly proposed technique that endeavors to reduce preparation of the tooth. These methods take advantage of better optical and mechanical characteristics of feldspathic ceramics that closely resemble the natural enamel but require less tooth tissue removal [3].

The double veneer technique involves the use of two axes of insertion in order to place these veneers without infringing into the healthy tooth surface thus retaining more of the original natural dentin and enamel [4]. This is a conservative approach of avoiding great loss of hard tissue, at the same time, it also makes the later restoration more stable, since the remaining hard tissue can provide a solid base for further work in case of later restorative treatment [5]. The two-axis insertion method for single-tooth veneers enables minimal tooth preparation, which reduces the risk of complications such as improper fit or excessive removal of tooth structure. This approach improves the predictability of the final outcome by ensuring better alignment and fit of the veneers. These results indicate that the double veneer technique is a feasible treatment modality for patients who require aesthetic restorations with minimal intervention, ensuring that the aesthetics of the restored tooth match the appearance of the adjacent teeth with an optimal and acceptable level of invasiveness [6]. About this approach it is significant to note that it promotes the use of advanced restorative procedures in combination with the principles of minimal intervention dentistry with the goal of achieving superior long-term outcomes of the dental restorations.

Materials and Methods

This case report demonstrates the clinical procedure of double feldspathic ceramic veneers with two axes of insertion for achieving the esthetic rehabilitation of anterior teeth with minimal invasive techniques, leading to the least loss of dental hard tissues. The patient is a 28-years male who wanted to have an improvement in esthetics of both the maxillary and mandibular anterior teeth. The most important treatment aim was to reduce the amount of enamel removed on proximal teeth during preparation and obtain adequate esthetics using only two veneers. These veneers were inserted with two different axes of inclination in order to minimize the amount of tooth structure removal necessary, which kept a great deal of the underlying dental hard tissue intact [7].

The temporary mock-ups were adjusted, and the mock-ups were assessed for proximal contacts, marginal fit, occlusal compatibility, and shade match. Each mock-up was created by a single dental technician following the manufacturer's guidelines to ensure consistency and high quality. [8]. Using a feldspathic ceramic veneer, each was treated with a 3% to <7% hydrofluoric acid (IPS Ceramic Etching Gel, Ivoclar Vivadent, Schaan, Liechtenstein) for 60 seconds. The etched veneers were rinsed with water, dried, and further cleaned for 60 seconds with 36% orthophosphoric acid (Blue Etch, Cerkamed, Stalowa Wola, Poland) to remove any remaining crystalline particles from the hydrofluoric acid. Subsequently, the veneers were ultrasonically cleaned in distilled water for 5 minutes to achieve optimal bonding strength. The etched surfaces were then treated with Monobond Plus silane (Ivoclar Vivadent, Schaan, Liechtenstein) for 60 seconds, rinsed, and dried to form a uniform silane layer [9]. For tooth preparation, a rubber dam was used to isolate the working field. The enamel surfaces of the teeth were prepared by sandblasting with 50 μm aluminum oxide (Al_2O_3 , RØNVIG Dental Mfg. A/S, Dagaard, Denmark) to improve bond strength. The teeth were then etched by immersion in 36% orthophosphoric acid (Blue Etch, Cerkamed, Stalowa Wola,

Poland) for 45 seconds, rinsed with water, and air dried. An adhesive layer (Adhese Universal VivaPen, Ivoclar Vivadent, Schaan, Liechtenstein) was then applied to the enamel surface and allowed to dry to form a monolayer [10].

The cementation step also entailed the use of a luting resin cement namely Variolink Esthetic LC (Ivoclar Vivadent, Schaan, Liechtenstein) which is a dual-cured cement. Unwanted resin material was sculpted away prior to polymerization by a microbrush and hand-instrumentation. All restorations were light-cured on each proximal side for 30 seconds at an intensity of approximately $1,470 \text{ mW/cm}^2$. The veneers were then covered with a glycerin gel and light polymerized for 20 seconds to remove the oxygen inhibition layer [11]. Upon cementation, any excess was removed with a scaler, dental floss and day razor blade. OptraFine Diamond Polishing System and interproximal polishing strips were used to finish the available margins of the restorations. The rubber dam was then removed, and final occlusal adjustments were done in centric relation as well as lateral and protrusive movements. The third and final step included polishing the ceramic surface with felt polishers using a high-gloss chamois paste (OptraFine HP) to achieve a high-gloss finish [12]. This procedure ensured a more conservative tooth reduction to hold the veneers in place and provide them with longevity, while at the same time maintaining as much of the original dental structure as possible. This technique showed the ability to obtain high aesthetic results with only a slight sacrifice of dental hard tissue (Figures 1, 2).



Figure 1. Insertion of Two Veneers Following Dual Axis Alignment



Figure 2. Aesthetic comparison of the smile (a) Before veneers insertion (b) After veneers insertion.

Results

The clinical outcome of the presented case was a successful double feldspathic ceramic veneer with bi-axial insertion. Intra-operative complications did not occur, and the immediate postoperative evaluation revealed excellent margins, ideal proximal contacts, and satisfactory occlusal relationships. The patient returned for annual follow-up visits and, specifically, for a comprehensive recall after six years. During this recall, a thorough clinical examination was conducted to assess the integrity and performance of the restorations. The examination revealed that all the veneers were intact, with no signs of fractures, chipping, or debonding. The marginal adaptation remained stable, and there was no evidence of secondary caries or any adverse tissue response around the restorations. Additionally, the patient reported high satisfaction with both the esthetic and functional outcomes of the treatment. Given the long-term stability of the restorations observed at the six-year recall, this case can be considered a success from a prosthetic standpoint. The preservation of the dental hard tissue, combined with the durability and esthetics of the feldspathic ceramic veneers, underscores the effectiveness of the double veneer technique in achieving long-term clinical success. This outcome supports the viability of this conservative approach for patients seeking minimal invasiveness while maintaining high aesthetic standards.

Discussion

Although long-term clinical trials are essential for further examination, the successful outcomes demonstrated in this case report suggest that this minimally invasive double feldspathic ceramic industrial veneer with two axes of insertion is an effective method to be used for esthetic dental restorations. This case presented an example of a technique that emphasizes conservation of dental hard tissues in order to achieve both beautiful appearance and function. After a 6-year follow-up period no fracture or debonding of the restorations was recorded, highlighting that this approach is sustainable over time [13]. Also helps in reducing tooth preparation which is one of the main advantages. One downside to the traditional single-axis veneer placement is that more tooth structure has to be removed in order for it to fit properly and host everything securely. However, the double veneer technique requires an even more conservative preparation without having to remove noticeable percentages of enamel and dentin. The preservation of natural tooth structure is essential not only for the short-term success of restoration but also long-term health and function, as it gives a healthy foundation to support future restorations [14]. In this situation the use of two different axes of insertion added an advantage making possible exact positioning without compromising dental structure. This method was established in order to reduce the risks such as weakening of tooth or more sensitivity by less controlled and minimal reduction of prepared teeth [15]. Additionally, the meticulous construction and adjustment of the veneers by a skilled dental technician ensured a perfect fit. Esthetic integration in combination with functional harmony should be implemented to enhance long-term efficacy during preparation procedures [16].

In addition, the bonding protocol used influenced longevity of the veneers in this case. Procedures such as hydrofluoric acid etching, silanization and dual-cure luting resin cement afforded a predictable bond of the ceramic veneers to tooth surface. This strong bonding, together with rigorous cementation technique detail care during performed process explains the excellent adhesive properties observed in this case report through a 6-year follow-up without signs of debonding or marginal breakdown after six years [17]. The results of this clinical report would suggest that double veneer restorations can be utilized with predictable and satisfactory outcomes, as demonstrated in the case reported here. This study supports our contention that when minimal invasiveness is an important consideration during treatment planning a two-veneer restoration might provide both excellent esthetic and functional properties. This will not only increase the lifespan of restorations but also helps to improve the healthy state and functionality of patient dentition [18]. The six-year recall period demonstrated no complications or restorative failures which adds to this success. Therefore, the double veneer with dual axes of insertion described here to restore esthetic provide an excellent addition for minimally invasive dentistry. The good long-term placement based on the

characteristics mentioned, plus its potential to preserve tooth structure makes this material seem a reasonable choice for patients seeking esthetic improvements without involving greater compromises in their natural teeth. Further studies to confirm the efficacy of this new technique on larger cohorts are necessary along with its extensive application in all aspects as well further researches is needed, through a longer-term follow-up would be required [18].

Conclusions

The use of double feldspathic ceramic veneers with two axes of insertion is an efficient and conservative option for aesthetic dental rehabilitation. This method preserves a significant amount of dental hard tissue, which is crucial for the durability and long-term health of the teeth. This case has been presented in a 6-year follow up to illustrate that not only with this method it is possible to achieve very good esthetic and functional results, but also offers stability of the restorations over time. The favorable results suggest that this approach offers a minimally invasive, patient-friendly solution for high-quality aesthetic restorations, making it ideal for those seeking more than just a filling. However, further research and clinical studies are needed to validate this technique and establish it as a standard in restorative dentistry.

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