Long-term performance of feldspathic ceramic veneers in anterior rehabilitation: A seven-year clinical case report

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Abstract

The purpose of this case report is to discuss the use and the predictable prognosis of feldspathic ceramic veneers for the anterior dental rehabilitation, especially when the preparation is beyond the traditional indication. Feldspathic ceramics are preferred in terms of aesthetics such as translucence and shade that makes it almost similar to dental enamel. But there is the issue of mechanical strength that comes into play whenever they are applied over rather diminished tooth structures. The present clinical case describes the situation where feldspathic veneers were bonded to all the anterior teeth, including centrals, laterals, and canines to which more than 2 mm of unsupported dental hard tissue was prepared. The highly dense veneers with a thickness higher than that recommended for AO manufacturing revealed good levels of durability and stability in seven years of their implementation. The success of this case really lies in the great bonding procedures and the solid knowledge of the material properties. This paper argues against a hypothesis stating that feldspathic veneers are not suitable for extensive tooth reduction, while proving their success even in unfavorable circumstances. Thus, according to the present study, the use of feldspathic ceramics in complex restorative situations proved to be clinically and aesthetically effective and is worthy to be further investigated in challenging clinical conditions.

Keywords: Unsupported dental hard tissue, wear facets, feldspathic ceramic veneers

INTRODUCTION

Feldspathic ceramic veneers are widely used for the reconstruction of the anterior teeth esthetics, because the material looks rather natural and is very similar to tooth enamel. These veneers are highly regarded for their ability to emulate the translucency and light-reflecting properties of natural teeth, a crucial factor in ensuring they blend seamlessly within the smile zone. (1,2). However, the mechanical strength of these restorations poses some problems more so in cases where there is loss of dental hard tissue and in cases of broken-down teeth, veneers on teeth with signs of attrition and discolouration (3,4).

In the case described, feldspathic ceramic veneers were placed on teeth 1. 1, 1. 2, 1. 3, 2. 1, 2. 2, 2. 3, and 2. 4, where the levels of wear of the enamel and dentine due to attrition and discoloration seemed to have been higher than the other groups (5).

These clinical conditions complicated cosmetic dentistry and required a dental preparation procedure more invasive than was otherwise traditional; the veneer thickness and the amount of dental tissue to be removed were beyond limits acknowledged as safe, with regard to mechanical retention and the predictability and longevity of the restorations (6,7).

In this paper, critical elaboration of clinical solutions to enhance the adhesion and stability of feldspathic veneers is provided with relation to case selection and application of high-level bonding techniques to deliver favourable outcomes even where conditions are less than ideal (8,9).

Aim and objectives

This article's purpose is to measure the clinical efficiency and durability of feldspathic ceramic veneers in restoring anterior teeth with severe attrition and discoloration. It particularly addresses instances where traditional prepping guidelines are exceeded. The aims include evaluating aesthetic outcome and functional outcomes of these veneers, especially in difficult situations involving severe wear of enamel and dentin. Moreover, it also examines how advanced bonding techniques can affect adhesions and stability of the veneer and finally offers some practical recommendations for getting the best results when they are used in complex restorative scenarios.

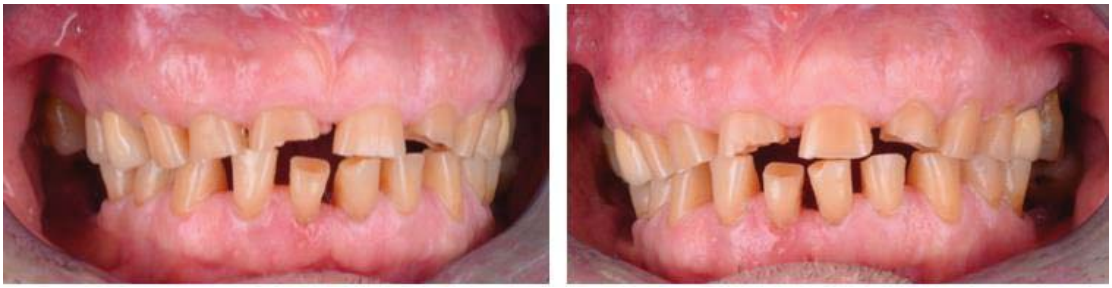
MATERIAL AND METHODS

Lack of attrition and discoloration of several anteriors particularly the maxillary 1. 1, 1. 2, 1. 3, 2. 1, 2. 2, 2. 3 and 2. 4 was a major concern of the patient who required functional and aesthetic rehabilitation. Due to the clinical state of erosion of the teeth, feldspathic ceramic veneers were chosen because of its high esthetic characteristics and its capability of matching closely the characteristics of the enamel. However, more importance was paid into the degree of the loss of dental tissue and the unsupported enamel. Before running to the final decision of accepting feldspathic ceramics, functional tests with regards to the enamel retain on the concerned teeth were made. By periodontal status, the unsupported enamel areas of the teeth were evaluated by the periodontal probe; these were measured according to the periodontal charting criteria that are commonly used. As per the said protocol, in case of unsupported enamel that was more than 2mm, then a more robust material such as lithium disilicate should have been used (10). Subsequently, it was found that the unsupported enamel on the incisors was below the recommended thickness for feldspathic veneers; the maximum being 1. Their thickness should be kept at a minimal of 3mm on one side of the veneer; the labial side. This extra reduction made the feldspathic ceramic capable of concealing the staining

whilst at the same time preserving the durability of the restoration (11). As much as it was the objective to have good esthetics in the visible zone, it was agreed to reconstruct the whole anteriors from canine to canine. Despite the initial dark shade of the abutment teeth (A4), the shade was not lightened beyond A3. This decision was made to achieve a natural, rather than artificial, aesthetic effect for the teeth, in line with best practices for ensuring a harmonious appearance in restorative dentistry (12-14).

a) b)

Figure 1. a), b) Appearance of Dental Units with Attrition Veneers Before Prosthetic Restorations



a) b)

Figure 2. a), b) Appearance of Dental Units with Attrition Veneers – Intraoral View

a) b)

Figure 3. a), b) Observation of Attrition Veneers in Oral and Frontal Norms with Associated Substance Loss

Figure 4. a) Fixing the Mock-Up in the Oral Cavity

Figure 5. a) Appearance of The Teeth After Fixing the Mock-Up in the Oral Cavity

a) b)

Figure 6. a) Guided Preparation Using a Mock-Up and Finishing of Restorations b) Finishing The Preparations with Discs: (3M™ Sof-Lex™ Finishing and Polishing Disc, United States)

Figure 7. a) Appearance of Dental Units After Guided Preparation

Figure 8. a) Appearance of Restorations in the Oral Norm After Preparation

Figure 9. a) Restorations on the Study Model

Figure 10. a) The fixation phase of feldspathic veneers to the prepared abutments

Figure 11. a) The Immediate Intraoral Result After Fixation

Figure 12. a) Final Appearance of the Restorations Fixed in the Patient's Oral Cavity

RESULTS

These feldspathic ceramic veneers done on the patient's anterior teeth in 2017 (1. 1, 1. 2, 1. 3, 2. 1, 2. 2, 2. 3, 2. 4) are still functional and strong after seven years of wear. The patient is now 72 years of age and the restorations have retained both the esthetic and the functional properties required. Interestingly, the broad aims of returning normal function and appearance have been met, and maintained long-term. In functional terms the treatment successfully re-established the capacity of the anterior group to effectively incise foods which was radically eroded by the subject's severe dental wear. Restablishment of the anterior guidance was the part of the treatment and the new guidance is fully functional with all the necessary characteristics of the anterior guidance. This has culminated in the enhancement of the patient's masticatory efficiency, and therefore functions of the mouth (15). From an esthetic point of view the defects created by the previous discoloration have been corrected and the anterior teeth have been shaped in the appropriate form. Feldspathic veneers resulted in a substantial enhancement of the patient's smile esthetics, in both, shade and form. If any veneers were to be done, it was done professionally to complement the newly whitened natural teeth of the patient. The density of the restorations has not significantly changed within the years, thus their color correction has highly satisfied the patient (16). In the same respect, the occlusal parameters were seen to improve after the restoration process had been completed. That fact that proper anterior guidance has now been regained has not only enhanced the function but also provided a much needed balance in the occlusion. These veneers have been bearing occlusal forces for the years and the treatment plan seems to be worthwhile (17). Altogether, the feldspathic ceramic veneers have given a long-term and appropriate rehabilitation concerning both the functional and esthetic aspects in this case. The patient has had positive changes in dental function, esthetics, and general oral health; the restorations are sill functional after seven years of usage (18).

DISCUSSIONS

This case demonstrates the possibility of employing feldspathic ceramic veneers in explaining the presence of marked dental tissue loss and discoloration. This appears in contrast with the historical preoccupations connected with the use of feldspathic ceramics, particularly as regards to their mechanical resistance when meeting the unsupported enamel. Based on these clinical findings made over seven years, it can be concluded that better enhance preparation and bonding now give feldspathic veneers quite promising and esthetic and reliable restorative solutions even for some complicated cases. Another important feature

of this case was a considerable amount of dental attrition under which incisal edges are worn out and masticatory function is affected. One of the main issues is an attrition, particularly localized to the anterior area, because the loads applied to restorations in this segment of the dentition are higher (19). However, the application of feldspathic veneers was able to rehabilitate incisal function and the patient was again able to incise the food. This is in agreement with other researches that have established that feldspathic ceramics resistance to functional forces in previously proven when well bonded to enamel was performed (20). Another significant aspect was the restoration of the discolouration that was severe in the patient's teeth. Feldspathic ceramics have the advantage in esthetic properties, mainly, translucency and the one that imitates the enamel. When a tooth is significantly discolored, selecting a material that matches the client's existing tooth color while providing sufficient opacity is crucial, especially when the goal is to achieve a natural-looking restoration (21). The feldspathic veneers used in this case helped meet the requirement for the discoloration and the outcome remains both functional and esthetic. This is in concordance with other authors who advocate for the use of feldspathic veneers in situations where severe discoloration is present and which may be difficult to provide the desired esthetic solution using the traditional ceramic materials (22). Another accomplishment of this treatment was the reestablishment of the anterior guidance. Therefore, it is crucial to have the correct anterior guidance in order to have balanced occlusion and reduce the amount of wear that might occur at posterior teeth. Although this case concerns only maxillary anterior teeth, the restoration of the anterior guidance also enhanced this patient's mastication efficiency and the stability and the longevity of the veneers (23). Such outcome is justified by the literature that stresses the potential role of a precise construction of anterior occlusion in the restoration of lost tooth structure to ensure functional occlusion as a key factor in place when a restoration is placed in the anterior zone of the dental arch (24). In addition, the long lasting of the feldspathic veneers in this case has been supported by the good affinitive between the enamel and the ceramic. It has been established that adhesive restorations are highly dependent on the bond formed and this is anchored on the preparation of the substrate, the bonding process and the properties of the adhesive-bonded system (25). In this case, when the veneers were bonded directly to the enamel there was a strong base which has withstood the pressure form occlusion for more than seven years. This is in conformity with other studies showing that bonding of enamel provides significant improvement in the mechanical retention and durability of feldspathic veneers. The successful outcome of this case suggests that using veneers alongside careful patient selection and precise clinical application can prove to be a highly efficient solution even, in situations where the usual tooth preparation standards are not straightforward. This case affirms the idea that despite being delicate in nature feldspathic ceramics can offer lasting and functional restorations for the front teeth when bonded correctly. The clinical observations detailed here add to the mounting evidence supporting the use of veneers as a choice in cosmetic dentistry even under less-than-ideal circumstances.

CONCLUSIONS

In summary, this case demonstrates the effectiveness of veneers as a solution for patients with significant wear and discoloration on their front teeth. Over seven years, these veneers have shown resilience and aesthetic quality, addressing cosmetic issues while restoring incisal function and enhancing chewing efficiency and bite stability. The ceramic materials used have withstood pressure and maintained their aesthetic appeal, even when traditional tooth preparation norms were adjusted, highlighting their adaptability in complex clinical scenarios. The strong bond between enamel and ceramic, combined with precise

preparation and bonding techniques, has ensured the longevity of the restorations. This case supports the use of veneers in treating severe discoloration and dental wear, affirming their role as a practical choice in cosmetic dentistry. Furthermore, the research underscores the functional and aesthetic benefits of feldspathic ceramics when carefully selected and applied, emphasizing the importance of advanced adhesion techniques and thoughtful decision-making in achieving successful prosthetic outcomes.

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