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Aesthetic Rehabilitation of Anterior Fractured Teeth with Partial Veneer: A Case Report

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Abstract **Case Report**

A variety of approaches can be employed to restore dentinal enamel fracture such as reattachment of the tooth fragment, direct composite restorations and indirect veneers. Thus, ceramic partial veneers or ceramic fragments are the most suitable option due to the increasing interest in minimally invasive dentistry and their superior optical behavior. They are considered as an innovative ultra-conservative approach that covers only the fractured part of the tooth surface without any preparation. Clinical protocol was however delicate. Bonding procedures must be highly respected and sectional veneer must be positioned carefully and checked regularly.Nowadays, Ceramic partial veneers are becoming a more popular approach but there are still concerns about the fracture strength and the survival rate of such restorations. This following report discusses the case of a patient presenting a fractured incisor that was rehabilitated using a ceramic partial veneer.

Keywords: Trauma, partial veneer, ceramic, minimal invasive dentistry, adhesion, aesthetic.

INTRODUCTION

Anterior teeth fractures represent one of the most common clinical situations in dental trauma. The post-traumatic therapeutic solution is, often, a challenge for the clinicians due to the variety of treatments.

Thus, choosing the correct treatment for simple fractures without pulpal and/or periodontal complications is based on several elements. It is mainly about the age of the patient, the extent of the fracture, the presence or absence of the tooth fragment as well as its conditions of use, the occlusion, the aesthetics, and finally the patient's expectations [1]. If a complete dental fragment is available, and if it is well-preserved, immediate reattachment may be possible [2].

Otherwise, direct resin restorations represent a suitable alternative despite their several disadvantages including color instability and limited resistance. To avoid the various deficiencies of composite resin, ceramic restorations has been developed. They have several important characteristics such as physicochemical stability, biocompatibility, sufficient mechanical resistance, excellent reproduction of the optical properties especially at minimal thickness, and color stability [3].

In addition, the development of minimally invasive dentistry led the clinician to choose the most conservative method possible by avoiding unnecessary loss of the dental structure while restoring function and appearance [4]. Recently, "sectional" veneers, also called "partial" veneers or "ceramic fragments" have been referred to in the dental literature [5]. They differ from the conventional ceramic laminate veneer in a way that there is almost no or less removal of dental tissue. The fractured portion of the tooth is reestablished only by additive approach [6].

The following report presents and discusses the case of a patient presenting a fractured incisor that was rehabilitated using a ceramic partial veneer.

CASE REPORT

A 20-year-old male patient suffering from a dental trauma at the level of the right upper lateral teeth. The extraoral examination revealed no significant abnormality. The intraoral one revealed that the tooth was asymptomatic, the vitality test was positive, and the percussion and palpation tests were negative. X-ray examination did not reveal any root damage or apical translucency. Finally, no dyschromia was observed.

In this case, the dental fragment was not available for an eventual reattachment. Thus, all currently available treatments were discussed: composite or ceramic restoration, direct or indirect veneer and partial or full buccal restoration. It was decided to perform ceramic partial veneer in order to preserve the existing tooth structure.

Before the restorative procedure, intraoral photographs were taken to analyze the cosmetic aspects of the case (Figure 1). The preparation consisted in rounding and smoothing all the internal surface (Figure 2). The provisional restoration was performed using waxed-up model and a bis-acryl provisional material (Dentocrown HD, ITENA, France) (Figure 3). A double silicone impression was made (Protesil, VANNINI, Italie). Then, the restoration was fabricated with feldspathic ceramic using the layering technique (figure 4-5). Before adhesive cementation, the restoration was evaluated clinically in terms of marginal adaptation and aesthetic result. As for the bonding resin, a transparent dual-cure one was selected (Variolink N, IVOCLAR, Switzerland). The following step was the application of a 9% hydrofluoric acid (Ceram-Etch, ITENA, France) on the inner side of partial veneer for 120 seconds. The restoration was washed in running water for 60 seconds, then a coupling agent: silane (Monobond N, IVOCLAR, Switzerland) was applied for 1 minute (Figure 6). As for the surface tooth, a partially sectioned rubber dam was performed to ensure perfect isolation (Figure 7). A selective etching was performed using a 37% orthophosphoric acid (Total Etch, IVOCLAR, Switzerland) (Figure 8). The acid was applied to the enamel for 30 seconds and to the dentin for 15 seconds. Then, dental surface was washed with water and slightly dried. The adhesive (Syntax Primer and Syntax Adhesive, IVOCLAR, Switzerland) was applied to the tooth by the mean of a micro brush and then dried with a gentle blast of air (Figure 9). The light-curing was not applied to avoid inaccuracies of fit. The resin cement (Variolink N, IVOCLAR, Switzerland) was placed on the inner side of the prosthetic piece and then light cured for five seconds (Figure 10). A micro brush was used to remove excess luting material (figure 11) and the restoration margin was covered with a film of glycerin to protect the final light curing of the bonding seal from exposure to oxygen (Liquid Strip, IVICLAR, Switzerland). After that, the curing cycle was finished for 60 seconds each surface. Finally, static and dynamic occlusion were controlled (Figure 12) and all the limits were delicately polished to ensure a smooth and luster surface (Figure 13).

Figure 1: Labial view of the teeth in static occlusion

Figure 2: Labial view after minimal preparation by rounding the internal surface

Figure 3: Provisional restoration

Figure 4: Partial veneer on the cast

Figure 5: Ceramic partial veneer

Figure 6: Surface treatment of the partial veneer: Application of hydrofluoric acid etching and silane application

Figure 7: Isolation of the teeth using a rubber dam

Figure 8: Application of the etching agent

Figure 9: Application of the bonding Agent

Figure 10: Light curing after sectional veneer placement

Figure 11: Excess resin removing

Figure 12: Occlusal adjustment

Figure 13: Finishing and polishing procedure

Figure 14: Labial view of the final result

DISCUSSION

Different therapeutic solutions may be encountered in the case of dentinal enamel fracture without pulp exposure. The first one is a resin composite direct restoration. It is noninvasive with practically no tissue sacrifice, it can be performed in a single appointment, and it is cost-efficient [7]. The second one is a conventional ceramic veneer which offers excellent aesthetic result and a predictable longevity but cannot be considered as very conservative or even a noninvasive treatment. This is an irreversible procedure that correspond to a favored option when the entire vestibular surface must be replaced [7].

While the practitioner choice should be guided by a therapeutic gradient with a systematic concern for saving residual tissue, ceramic partial veneers have been suggested as an innovative ultra-conservative technique. They are suitable alternatives to direct restorations and conventional ceramic veneers when restoring a limited defect. In this context, a sectional veneer was indicated in the current case report, allowing to combine high aesthetic, strength, and adhesion in a minimally invasive way.

Usually, partial veneers on anterior teeth are performed in a couple of situations such as replacing an old restoration, restoring a fracture, closing a diastema, changing the shape of the tooth (from triangular to square, to close black triangles), and covering cervical abrasions or root exposure (type V restoration) [8]. In the other side, some contraindications such as extensive restoration with insufficient enamel tissue, fracture with pulp exposure, discolored dental substrate, and parafunctional habits should be taken in consideration.

In fact, this approach has many advantages: The procedure is reversible when no preparation is needed, with no post-operative sensitivity and the impression technique is simplified. However, the common problem is the interface between ceramic and

enamel which may be visible causing an impact on the aesthetic outcome. That's why, some authors restricted its usage to patients with a low smile line revealing only half the buccal surfaces of the teeth without the appearance of the gingiva [9].

Careful attention should be required to the evaluation of the occlusion. The centric occlusal contact shouldn't fall on the interface between restoration and enamel. So, the finish line should be placed either before the contact in the enamel tissue, or after leaving it in ceramic [8]. After cementation, the occlusal adjustment is very important, not only in centric but mostly in protrusive movement. A poor adjustment can increase the chance of chipping or debonding [8].

Additionally, a special attention should be given to the thickness of resin cement. In fact, in order to optimize the aesthetic outcome, a minimum thickness of resin cement at the interface is required since composites are more prone to wear and discoloration than ceramic restorations [5]. A range of 0.1 mm-0.2 mm thickness has been considered acceptable [10].

Furthermore, partial veneers are critical when it comes to handling and bonding on the correct position due to the delicate size of the restoration. The use of stick coated with sticky wax to handle the chip is well recommended. Even in laboratory, this problem has been reported leading to a very delicate fabrication of this type of prostheses.

Regarding material selection and laboratory procedure, color, opacity, and translucency of the adjacent natural teeth could be successfully mimicked by the restoration [11]. Feldspathic and glass-ceramics are described for the construction of sectional veneer. The layering technique meets aesthetic expectation by the use of different shades and the reproduction of incisal translucency. Actually, ceramic blocks with a color gradient can also be used. They are characterized by higher translucency to incisal regions and lower translucency to cervical regions avoiding the need of a layering step and therefore reducing the time required for fabrication [12].

The success depends on a combination of sound adhesive principles, adequate design of the restoration, laboratory experience, and cementation techniques [13]. Periodic controls and proper maintenance of the restorations must be performed to insure a long-lasting result.

However, there is a lack of detailed information about mechanical behavior and long-term performance of sectional veneer. Only, one *in vitro* study, has shown for the first time that partial laminate veneers can exhibit fracture strength values similar to direct composite restorations or conventional laminate veneers [6]. Also, according to a three-dimensional finite element stress analysis, if the porcelain sectional veneer is out of occlusion and the occlusal force is parallel to the longitudinal axis of the tooth, restoration longevity can be expected [14]. Another in-vitro study evaluated the fracture strength of porcelain sectional veneers made from two different sintered feldspathic porcelains, the load was applied at the incisal edge and according to the longitudinal axis of the specimens. This study showed that feldspathic porcelain used for sectional veneers did not affect the fracture strength and that no adhesive failure was detected [15].

According to some authors, the popularity of the ceramic sectional veneer technique is limited because of the technically demanding clinical procedure and the delicate laboratory fabrication process. Another limitation is the high risk of accidental breakage and post-bonding crack formation due to the reduced ceramic thickness and the unfavorable ceramic/composite resin cement thickness ratio [16].

CONCLUSION

Partial veneer allows the preservation of dental tissue with a highly satisfactory aesthetic result. They should be considered for situations in which the dental elements are healthy and can be modified exclusively by material addition. Long-term clinical studies for sectional veneers are not yet available. Further research are necessary to provide predictable results.

REFERENCES

1. Bansode, P. V., Pathak, S. D., Wavdhane, M. B., & Bhunne, S. S. (2020). Fractured Fragment Reattachment: ―Preserving the Natural Tooth: A Case Report. *International Journal of Science and Research*, 10, 883-887.
2. Rappelli, G., Massaccesi, C., & Putignano, A. (2002). Clinical procedures for the immediate reattachment of a tooth fragment. *Dental traumatology*, *18*(5), 281-284.
3. Pini, N. P., Aguiar, F. H. B., Lima, D. A. N. L., Lovadino, J. R., Terada, R. S. S., & Pascotto, R. C. (2012). Advances in dental veneers: materials, applications, and techniques. *Clinical, cosmetic and investigational dentistry*, *4*, 9.
4. Farias-Neto, A., Gomes, E. M. D. C. F., Sánchez-Ayala, A., Sánchez-Ayala, A., & Vilanova, L. S. R. (2015). Esthetic rehabilitation of the smile with no-prep porcelain laminates and partial veneers. *Case reports in dentistry*, *2015*.
5. Gresnigt, M., & Özcan, M. (2011). Esthetic rehabilitation of anterior teeth with porcelain laminates and sectional veneers. *Journal of the Canadian Dental Association*, *77*, b143
6. Gresnigt, M. M., Sugii, M. M., Johanns, K. B., & van der Made, S. A. (2021). Comparison of conventional ceramic laminate veneers, partial laminate veneers and direct composite resin restorations in fracture strength after aging. *Journal*

of the mechanical behavior of biomedical materials, *114*, 104172

7. Signore, A., Kaitsas, V., Tonoli, A., Angiero, F., Silvestrini-Biavati, A., & Benedicenti, S. (2013). Sectional porcelain veneers for a maxillary midline diastema closure: A case report. *Quintessence International*, *44*(3).
8. Coachman, C. (2013). Partial Porcelain Veneers: Clinical and Laboratorial Considerations. The Dental Experts.
9. Ceinos, R., Pouyssegur, V., Allard, Y., & Bertrand, M. F. (2018). Esthetic rehabilitation of the smile with partial laminate veneers in an older adult. *Clinical case reports*, *6*(8), 1407
10. RAVI, A., RAJ, R. S., BABU, A. S., KEEPANASSERIL, A., & MATHEW, A. (2019). Effectiveness of Shade and Thickness of Resin Cement on the Final Colour of the Porcelain Laminate Veneer: A Scoping Review. *Journal of Clinical & Diagnostic Research*, *13*(2).
11. Horvath, S., & Schulz, C. P. (2012). Minimally invasive restoration of a maxillary central incisor with a partial veneer. *Eur J Esthet Dent*, *7*(1), 6-16.
12. Sinhori, B. S., Monteiro Jr, S., Bernardon, J. K., & Baratieri, L. N. (2018). CAD/CAM ceramic fragments in anterior teeth: A clinical report. *Journal of Esthetic and Restorative Dentistry*, *30*(2), 96-100.
13. Vadini, M., D'Amario, M., De Angelis, F., Falco, A., & D'Arcangelo, C. (2016). No-prep rehabilitation of fractured maxillary incisors with partial veneers. *Journal of Esthetic and Restorative Dentistry*, *28*(6), 351-358.
14. Mozayek, R. S., Allaf, M., & Dayoub, S. (2019). Porcelain sectional veneers, an ultra-conservative technique for diastema closure (three-dimensional finite element stress analysis). *Dental and Medical Problems*, *56*(2), 179-183.
15. Mozayek, R. S., Alkhalil, M. A., Allaf, M., & Dayoub, S. (2019). Evaluation of the fracture strength of porcelain sectional veneers made from different sintered feldspathic porcelains: An in vitro study. *Dental and Medical Problems*, *56*(3), 273-278.
16. Novelli, C., & Scribante, A. (2020). Minimally invasive diastema restoration with prefabricated sectional veneers. *Dentistry Journal*, *8*(2), 60.