A COMBINATION OF INTRA AND EXTRA ORAL TECHNIQUE FOR REPAIRING A MULTI-UNIT METAL CERAMIC FIXED PARTIAL DENTURE

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ABSTRACT
Metal-ceramic restorations have been used for several decades by clinicians to provide esthetics and masticatory function. MC restorations have the potential for fracture of the ceramic veneer, which poses serious cosmetic and clinical problems. It may be desirable to repair broken retainers of a fixed prosthesis rather than removing it and aggravate the possibility of destroying an entire underneath restorations or/damaging the abutment teeth. Fracture of porcelain crowns, particularly on anterior teeth, requires a rapid resolution. Repair can be achieved with relative ease using of a composite resin material. Repairing ceramic-based restorations can increase the clinical longevity of failed restorations and offers both dentist and patient a cost-effective alternative to replacements, which could be the next best treatment that allows further function of the prosthesis until a more permanent solution can be rendered. The intra-oral repair with composite for fractured porcelain and metal exposure is more problematic due to different characteristics of each particular material. However, this can be used as a long-term temporary solution.

A modified over-casting technique can be used to repair fractured MC restoration in the presence of more than one joined retainers with sufficient (adequate or enough) inter-proximal spaces, thin connectors and clinical acceptance of the remaining retainers. The new retainers replaced fractured MC crowns in the presence of multi-units retainers joined together is time saving and minimizing the cost for the patient and solves the esthetic problem as well. This paper reports an intra-oral porcelain repair with periodontal treatment and modified over-casting techniques in a 30 years old female patient followed by the fracture of porcelain and metal exposure of maxillary central incisors in a three unit fixed partial denture.

Key Words: Porcelain repair; Periodontal treatment; Composite; Over-casting.

Introduction
Metal-ceramic restorations (MC) have been used for several decades to provide esthetics and masticatory function. MC restorations have the potential for fracture of the ceramic veneer, which poses serious cosmetic and clinical problems. It may be desirable to repair broken retainers of a fixed prosthesis rather than removing it and aggravate the possibility of destroying an entire underneath restorations or/damaging the abutment teeth. Fracture of porcelain crowns, particularly on anterior teeth, requires a rapid resolution. Repair can be achieved with relative ease using of a composite resin material. Repairing ceramic-based restorations can increase the clinical longevity of failed restorations and offers both dentist and patient a cost-effective alternative to replacements, which could be the next best treatment that allows further function of the prosthesis until a more permanent solution can be rendered. The intra-oral repair with composite for fractured porcelain and metal exposure is more problematic due to different characteristics of each particular material. However, this can be used as a long-term temporary solution.

A modified over-casting technique can be used to repair fractured MC restoration in the presence of more than one joined retainers with sufficient (adequate or enough) inter-proximal spaces, thin connectors and clinical acceptance of the remaining retainers. The new retainers replaced fractured MC crowns in the presence of multi-units retainers joined together is time saving and minimizing the cost for the patient and solves the esthetic problem as well. This paper reports an intra-oral porcelain repair with periodontal treatment and modified over-casting techniques in a 30 years old female patient followed by the fracture of porcelain and metal exposure of maxillary central incisors in a three unit fixed partial denture.

Case report
A 30 year old female patient reported to King Khalid University College of Dentistry Specialty Clinic. The patient was complaining of ugly smile due to trauma in a private dental clinic results in chipping of the porcelain coverage and metal exposure of a maxillary multi-unit fixed partial denture. Clinical and radio-graphical examinations showed a clinically acceptable thirteen MC unites bridge which is extending from tooth 16 to tooth 27 with missing teeth 15,25 and 26. However, the free gingiva of maxillary anterior teeth was inflamed, swollen and over filled the interdental embrasures (Figure 1,2). During the first visit scaling and root planing were done and oral hygiene instructions given. Followed by that, an Intra-oral repair with composite was also done according to the intraoral composite repair protocol (Tertic-N-Ceramic, Ivoclar Vivadent, Lichtenstein). This was done immediately after a surface treatment of the metal substructure with a course diamond bur (Meisinger, Germany) (Figure 3). Recall intervals were scheduled (a week, a month and then four months) to assess the effectiveness of the periodontal treatment and disappearing of the free gingival and interdental papilla inflammation.

In the fourth recall interval after 4 months of the composite repair and periodontal disease resolving an index with putty impression material for maxillary anterior teeth was taken for provisional crowns construction. Without the use of local anesthesia separation of the composite and MC retainers from both maxillary central incisors teeth and connectors disconnection in both distal sides of teeth 11 and 21 using diamond burs were done (Meisinger, Germany) (Figure 4). Then the connectors from both sides were smoothed by diamond bur. After giving a local anesthesia, the preparation of prepared teeth 11 and 12 was finalized and a final impression (Virtual, Ivoclar Vivadent, Lichtenstein) using double mixing technique were taken. The opposing impression was taken by dust free alginate impression material using metal stock tray. Cementation of the provisional crowns was also done with temporary cement (Temp-BondNT, Italy).

The maxillary and mandibular casts were mounted manually using Di-Lok tray (Di-Equi Dental Products, Wappingers Falls N.Y). In Laboratory, step by step has been done to construct these two individual metal ceramic crowns, including die preparation, wax-up, coping and metal casting (Wiron - 99, Bego, Germany) (Figure 5). In addition, ceramic build-up (VMK 95, Vita, Germany) and shade guide selection (2M2 - 3D master) were followed as per the manufacturer’s instruction (Figure 6). At subsequent appointment ceramic try-in and occlusion adjustment before glazing and cementation with modified glass ionomer cements Relaxy (3M ESPE, Germany) were done (Figure 7,8). The patient was followed-up and recalled after 4 and 8 months for maintenance phase.
Discussion

When a clinical fracture of a ceramic veneer on ceramo-metal can be repaired, the need for remaking can be eliminated. MC failures often begin as porcelain fracture that may be caused by inappropriate coping design, poor abutment preparation, technical errors, contamination, physical trauma or occlusal premature. The complexity of the oral environment, varied surface topography of dental restorations and an inability to bond the repair material to porcelain successfully for long-term plays a major role in the durability and longevity of intra-oral porcelain repair bond. Main principle for MC restoration is simplification during FPD design. Logical sequence of treatment should be planned and prior to the commencement of any fixed prosthodontic intervention, periodontal treatment has to be completed. FPD design should be simple as possible, with single well-anchored retainer fixed rigidity at each end of the pontic.

In this case the intra oral composite repair was applied according to the repairing protocol mentioned in the literature. The periodontal treatment was a part of the treatment plan due to the presence of gingivitis in the area of fracture. A modified over-casting technique for teeth 11 and 21 was applied for construction of individual crowns due to the presence of thin connectors joining them on both distal sides to the remaining long multi-unit bridge. The presence of more abutments in both sides was a favoring factor for good prognosis.

In this technique, the fractured crowns were prepared by removing the repaired composite on the remaining porcelain and substructure metal from. The steps include impression, metal try-in and shade matching, selection, porcelain try-in and cementation in a traditional manner for crown construction. The advantage of this treatment plan includes saving the remaining units of the bridge in the patient mouth without any trauma to the abutment teeth with reduction in the cost for patient to construct a new FPD. A maximum degree of esthetic at the maxillary anterior teeth was achieved. The patient can practice standard oral hygiene measures in the repaired area which is important for esthetics.

Conclusion

In conclusion a combination of intraoral composite repair for fractured MC restoration with periodontal treatment and sectioning of multiunit bridges into crowns and bridges minimize trauma to the abutment teeth without compromising the esthetics and function.

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