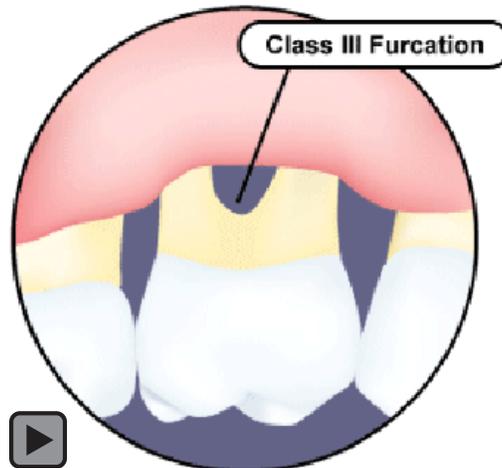


## Retention of Maxillary Molars with Class III Furcation Involvement Utilizing Glass-Ionomer: Two Case Reports

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### Abstract

Advanced furcation invasion has long been a treatment dilemma for the clinician. The present two case reports used a glass ionomer restorative material as a barrier in the treatment of maxillary Class III furcation defects. One year follow-up results showed a reduction in tooth mobility and probing depths and no bleeding on probing with the use of the glass ionomer. These case reports offer another option in the treatment of a seemingly hopeless periodontally involved maxillary molar.

**Keywords:** Glass ionomer, permanent, furcation therapy, molar, dental materials

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## Introduction

Treatment of Class III furcation<sup>1</sup> has historically been less than predictable. Long-term studies have demonstrated poor survival rates of teeth with advanced furcation involvement.<sup>2, 3, 4</sup> Although multiple treatment modalities have been attempted to retain teeth with severe furcation invasion, clinical success has not been predictable. Treatment attempts range from non-surgical therapy<sup>1</sup>, furcation obliteration, surgery to increase access to the furcation<sup>5</sup>, root resections<sup>6, 7</sup>, tunnel procedure<sup>8</sup>, guided tissue regeneration<sup>9, 10, 11, 12</sup>, and a combination of graft materials, membranes, and coronally positioned flaps.<sup>13, 14, 15, 16</sup>

Regenerative techniques that have been successful in the treatment of Class II mandibular furcation involvements have been less predictable when performed in Class III situations.<sup>17</sup> In the past restorative materials have been used to obliterate furcation; the goal was to improve plaque control by eliminating the anatomic niches within the furcation where bacteria can accumulate. Also, in the past polymeric reinforced zinc oxide-eugenol (IRM), amalgam, glass ionomer, and resin ionomer restorative materials were utilized to fill Class III furcation invasions.<sup>18, 19, 20, 21</sup>

Van Swol and coworkers<sup>18</sup> compared amalgam, zinc oxyphosphate cement, and glass ionomer in the treatment of surgically created furcation in non-human primates. Radiographs taken at various time intervals demonstrated radiolucency with all materials utilized. Glass ionomer produced only slight radiolucent changes that were less likely to progress with time. The authors reported the greatest biocompatibility with glass ionomer via histological evaluation. Scherer and Drago<sup>22</sup> utilized modified resin-ionomer restorations into subgingival locations and attempted to delineate ideal characteristics of a material used in this manner. A follow-up study by Drago<sup>23</sup> suggested histologic evidence of epithelial and connective tissue adherence to the resin-ionomer restorative materials utilized subgingivally. The author reported the gingival tissues tolerated the material well and felt resin-ionomers possess biocompatibility with the

periodontium. In case reports by White Jr.<sup>24</sup> and Breault et al.<sup>25</sup> resin and resin-ionomers were placed subgingivally to repair areas of root resorption. Breault et al.<sup>26</sup> utilized resin-ionomers to treat maxillary Class II furcations and an abfraction.

In the present two case reports a glass ionomer restorative material [GC Fuji II, GC Corporation, Tokyo, Japan] was used as an occlusive barrier in the treatment of multi-furcated maxillary molars.

## Case Report

### Case 1

A 50-year old male patient presented with Class III furcation defects involving all three furcations in both the maxillary first molars.<sup>1</sup> Both teeth had in common a “poor to hopeless” prognosis, based on the clinical parameters of Grade II mobility, probing depths (> 8 mm), and inflammation. The two molars were vital with no periapical radiographic changes. After explaining treatment options to the patient (including extraction), the patient elected to have glass ionomer placed as an occlusive barrier over his furcation defects.

Following administration of local anesthesia using local infiltration of 2% Lidocaine with a concentration of 1:200,000 epinephrine, sulcular incisions were made. Vertical releasing incisions at distobuccal line angle of the second premolar were done, and full-thickness mucogingival flaps were reflected to expose all three furcation entrances (Figures 1 and 2).



**Figure 1.** Pre-operative view of the right maxillary first molar with Class III furcation defects.

The area was debrided, scaled and root planed using curettes and ultrasonic scalers. The area was irrigated with 0.2% chlorhexidine gluconate solution to disinfect the area. Due to the extent of the furcal defects and the poor chances of regenerating enough hard tissue support using traditional membrane therapy, an occlusive barrier using a glass ionomer was used to 'fill-in' the furcations and prevent a recurrence of bacteria and/or debris accumulation into the furcation, thus, resulting in a periodontal abscess. Also, by reducing the concavities of the furcations, home care would be easier. The glass ionomer was placed using a plastic instrument in all three furcations, and the excessive material was removed with No. 15 B.P. blade (Figure 3).

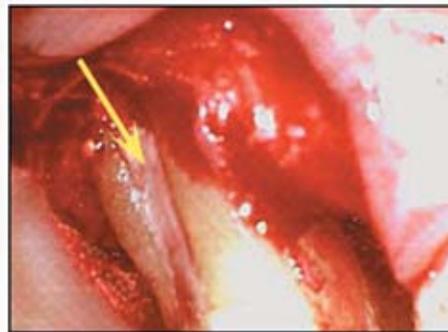
The flaps were replaced using 4-0 direct-interrupted silk sutures. The patient was advised to use 0.2% chlorhexidine gluconate mouth rinse twice daily for two weeks. The patient was provided with postoperative and home care instructions. The patient was prescribed antibiotics (amoxicillin 500 mg, three times daily for seven days) to reduce the risk of infection post operatively. Sutures were removed after seven days. Patient returned weekly for the first month for post surgical evaluation and reinforcement of plaque control. The patient was seen at three and six month intervals for supportive periodontal therapy. After one year post-operatively, teeth were re-evaluated for the following clinical parameters: tooth mobility, probing depth, bleeding on probing, and plaque levels. There was only Grade I mobility, <5 mm probing depth, no bleeding on probing, and a plaque record of 10%. Best of all, the patient was asymptomatic. The teeth were in function and did not experience any abscess or discomfort (Figure 4).

### Case 2

A 45-year old female patient presented with Class III furcation defects (Hamp et al.)<sup>1</sup> involving all three furcations in the left maxillary first molar with a "poor to hopeless" prognosis, based on the clinical parameters of Grade II mobility, > 8 mm probing depth, inflammation, and no periapical radiographic changes. After explaining treatment options to the patient, including extraction, patient elected to have glass ionomer placed as an occlusive barrier over her furcation defects.



**Figure 2.** Buccal furcation defect following debridement.



**Figure 3.** Buccal furcation defect restored with glass ionomer.



**Figure 4.** One year following view. Discoloration of the sealant in the furcation is due to staining.

Following administration of local anesthesia using local infiltration of 2% Lidocaine with a concentration of 1:200,000 epinephrine, sulcular incisions were made. Vertical releasing incisions at distobuccal line angle of the second premolar were done, and full-thickness mucogingival flaps were reflected to expose all three furcation entrances (Figures 5 and 6).

The area was debrided, scaled and root planed using curettes and ultrasonic scalers. The area was irrigated with 0.2% chlorhexidine gluconate solution to disinfect the area. Glass ionomer was used to 'fill-in' the furcations (Figure 7). The flaps were replaced using 4-0 direct-interrupted silk sutures (Figure 8). The patient was advised to use 0.2% chlorhexidine gluconate mouth rinse twice daily for two weeks. The patient was prescribed antibiotics (amoxicillin 500 mg, three times daily for seven days) to reduce the risk of infection post operatively. Sutures were removed after seven days.

Patient returned weekly for the first month for post surgical evaluation and reinforcement of plaque control. Patient was seen at three and six months for supportive periodontal therapy. After one year post-operatively, the tooth was re-evaluated and there was only Grade I mobility, <5 mm probing depth, no bleeding on probing, and a plaque record of 10%. The tooth was in function and did not experience any abscess or discomfort.

### Discussion

Three maxillary molars that received glass ionomer restorations were functional and asymptomatic, and the patients were experiencing no adverse problems one year after the restorations were placed. The results of these two case reports illustrates the long-term prognosis that a traditionally hopeless maxillary molar can be improved by using an occlusive barrier, such as a glass ionomer restoration. Not only does the barrier seal the furcation entrance from epithelial, bacterial, and food debris invasion but may enable easier home care due to the reduced surface area of the furcation left to clean.

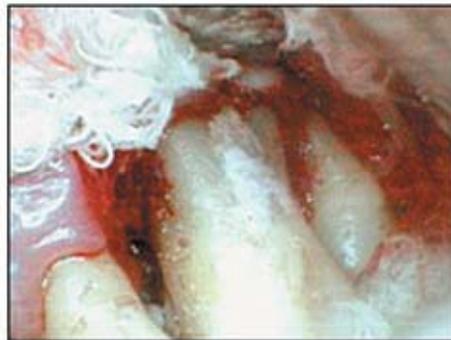
The use of a glass ionomer to regenerate the attachment apparatus in the treatment of advanced furcation involvement was not the goal of the treatment. There was no intention to regenerate any tissue, hard or soft. The goal of selecting this mode of therapy was simply to retain hopeless maxillary molars with advanced furcation defects.



**Figure 5.** Pre operative view of left maxillary first molar with Class III furcation defects.



**Figure 6.** Buccal furcation defect following debridement.



**Figure 7.** Buccal furcation defect restored with glass ionomer.



**Figure 8.** Post operative view.

## Conclusion

Potential advantages of an occlusive barrier such as glass ionomer include:

- Ease of placement
- Does not require a suture for stability
- Elimination of a second stage procedure for retrieval of the membrane since it is permanently bonded
- Long junctional epithelial attachment to the glass ionomer<sup>22</sup>
- Does not require complete coverage by the gingival flap

- Bacteriostatic due to fluoride release<sup>27</sup>
- Lower cost

To potentially determine a greater clinical significance, studies with a larger sample size and control must be done. Within the limitations of these case reports, it can be concluded a glass ionomer restorative material may be effective as an occlusal barrier when treating maxillary molar Class III furcation defects.

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