USE OF RESIN – IONOMER IN GRADE III FURCATION DEFECTS – AN ALTERNATIVE TREATMENT OPTION : CASE SERIES

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Regenerative therapy is considered the norm today in periodontics. However, there are many clinical conditions where predictable regeneration cannot be achieved with our current knowledge and materials available. One example of such a situation is grade III furcation involvement in multirooted teeth. In recent literature, studies have shown that resin-ionomer can be used to enhance tooth retention, function and maintenance of personal oral hygiene in specific periodontal conditions including grade III furcation involvement cases. Thus, in the present study light cure glass ionomer cement was used to treat teeth with grade III furcation involvement in 5 cases. Clinical reevaluation at the end of 3 months revealed a reduction of probing depths gingival inflammation. This study offers another treatment option in the treatment of grade III furcation cases.

INTRODUCTION

Regenerative therapy is considered the norm today in periodontics. However, there are many clinical conditions where predictable regeneration cannot be achieved with our current knowledge and materials available. One example of such a situation is grade III furcation involvement in multirooted teeth.

The extension of inflammatory periodontal disease into the furcation areas reduces the success rate of regenerative therapy in these specific areas. This different behaviour has been explained in part due to the complexity of the furcation morphology and hence limitation in accessibility to debride the defect properly during periodontal therapy, and secondly due to difficulty in developing appropriate patient compliance in plaque control.

Except for a small number of studies, most success regarding success of regeneration of furcations, using the principle of guided tissue regeneration with or without bone grafts, apply to grade II or less furcations in mandibular molars[1,2]. Also, it has been reported that regeneration of maxillary molars is even less predictable[3]. This is attributed to the multiple root anatomy and multiple furcation entrances. Usually the close root proximity prevents adequate bone quantity to gain the necessary regenerative cells. Also, trying to configure, place and stabilize membranes around a multirooted tooth is difficult. Once the surgical procedure is completed, then maintenance and home care of the surgical site become concerns, adding to the higher failure rate.

In recent literature, studies have shown that resin-ionomer can be used to enhance tooth retention, function and maintenance of personal oral hygiene in specific periodontal conditions in teeth, which were previously considered hopeless[4,5,6,7].

Therefore, the purpose of the present study was to present a case-series using resin-ionomer (light cure glass ionomer cement) in the treatment of maxillary and mandibular molars with grade III furcation involvement.

MATERIALS AND METHODS

The sample size consisted of *five cases*, which had grade III furcation involvement, three with maxillary molars and two with mandibular molars involved. All subjects were informed of their oral condition and received an oral and written explanation of the procedures to be performed. They were also required to

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sign an informed consent prior to the start of the procedure.

Clinical documentation included periapical radiographs and assessment of gingival inflammation based on the presence or absence of redness and bleeding on probing. Pre-operative preparation consisted of scaling and polishing, as well as instructions in oral hygiene. The resin-ionomer material used in the study was GC Fuji II LC, a light cure glass ionomer cement. The material was used according to the manufacturer's instructions.

The clinical protocol that was followed was: After obtaining adequate anaesthesia, a full thickness mucoperiosteal flap was elevated and the furcation defects were thoroughly debrided. To control the haemorrhage from the periodontal ligament and alveolar bone, a 30% solution of hydrogen peroxide on a cotton pellet was applied to the surgical site for five seconds to achieve haemostasis, as suggested by Dragoo[5]. The H2O2 used also served to etch the root surface. Following this, resin ionomer was placed in the furcations and light cured for 30 seconds. The excessive resin was removed with a fine grit diamond, the resin smoothed and polished. The gingival flaps were replaced using a 4-0 interrupted silk suture.

The patient was provided with post-operative and home-care instructions and prescription for chlorhexidine gluconate 0.2% and analgesics. The sutures were removed after one week and from then on, the patients were examined on a weekly basis for the 1st month and every two weeks for the next two months.

The results were evaluated *clinically at the end of three months* in terms of:

1) Reduction in gingival inflammation- as assessed by redness and bleeding on probing.
2) Recording of probing depths- pre-operatively and post-operatively at the end of three months.
3) Any observed gingival recession adjacent to the restoration.

CLINICAL CASE REPORTS

Representative case reports from the 5 cases evaluated are presented below:

I) MANDIBULAR MOLAR WITH GRADE III FURCATION INVOLVEMENT-

A 30-year old man presented with persistent bleeding in relation to mandibular left first molar, tooth number 36. Radiographic evidence revealed extensive bone loss in the furcation area and distal to the involved tooth. The tooth had been endodontically treated 5 months back. Probing assessment revealed a probing depth of 5 mm (Fig 1). Following flap reflection, thorough debridement revealed a grade III furcation involvement and bone loss extending distal to the tooth (Fig 2). The furcation area was sealed with light cure glass ionomer cement from both the buccal and the lingual sides (Fig 3). Light curing allowed immediate finishing of the restoration, following which the flaps were sutured after positioning them in a coronal position (Fig 4) (only in this case).

Reevaluation at the end of three months revealed no gingival inflammation adjacent to the restoration, as assessed by absence of redness and bleeding on probing. Probing assessment revealed reduction in probing depth from 5 mm to 3 mm (Fig 5), which suggested tissue attachment to the restoration. Moreover, there was no gingival recession adjacent to the restoration. On the contrary, the flap had retained its coronal position. The tooth was asymptomatic and the patient was able to maintain proper oral hygiene in the restored furcation area. A unitufted brush was advised to facilitate maintenance of oral hygiene distal to the treated tooth

II) MAXILLARY MOLAR WITH GRADE III FURCATION INVOLVEMENT:

A 35-year old female presented with persistent pus discharge in relation to maxillary left first molar, tooth number 26. The tooth had undergone endodontic treatment 2 months back. Probing assessment revealed a pocket depth of 6 mm (Fig 6). Flap reflection and debridement revealed extensive bone loss in the furcation area as well as around the

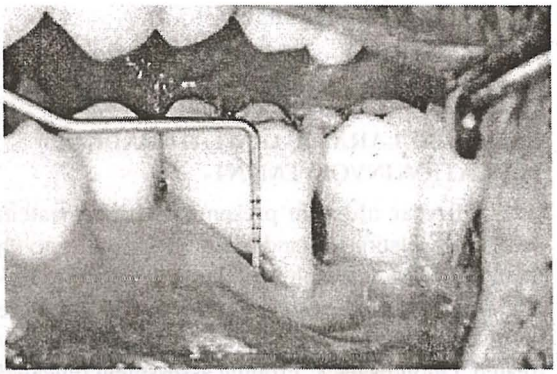


Fig 1: Pre-operative probing depth: 5mm.

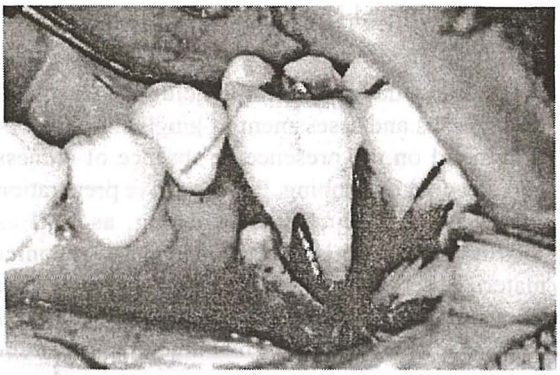


Fig 2: Flap elevation & debridement reveals a grade III furcation involvement.

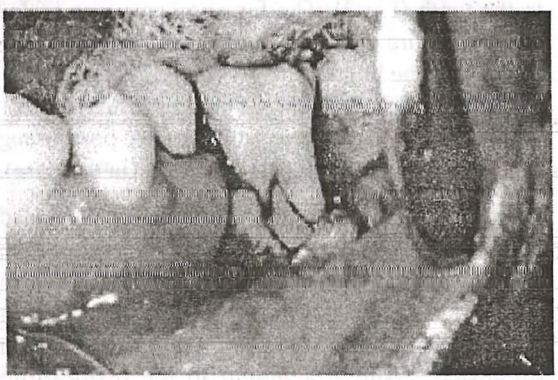


Fig 3. Furcation entrance sealed with light cure G.I.C.

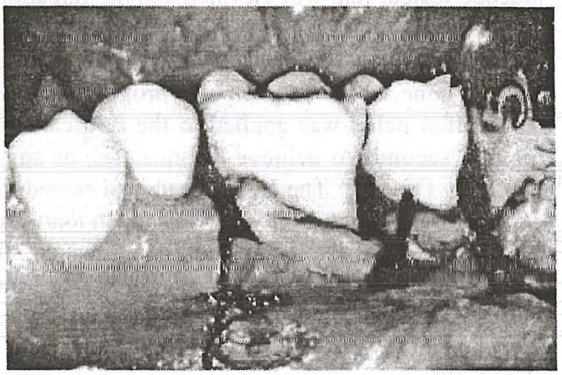


Fig 4. Flap coronally positioned and sutured.

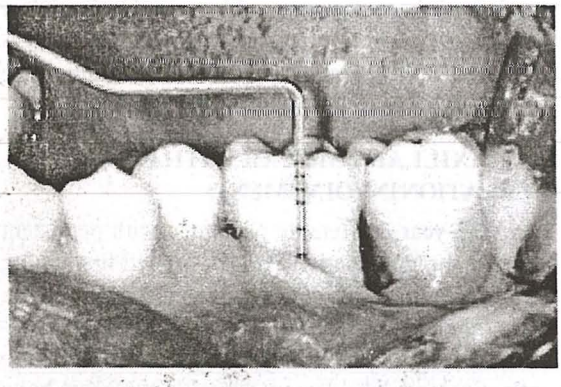


Fig 5: Post-Operative probing depth: 3 mm

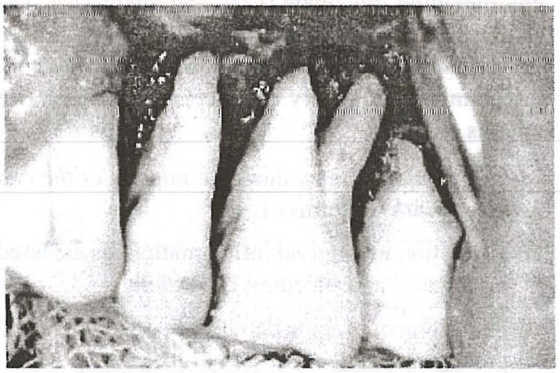


Fig 6: Flap elevation & debridement reveals a grade III furcation involvement.

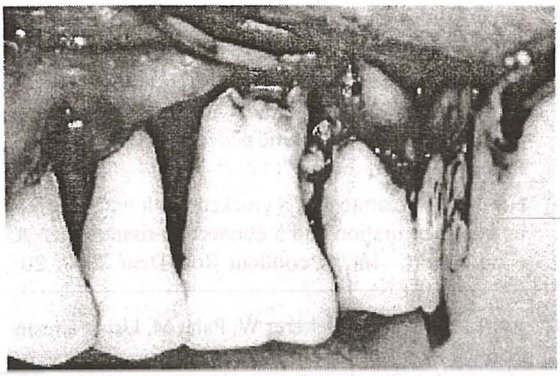


Fig 7: Furcation obliterated with light cure GIC and restoration polished.

distobuccal root (Fig 7). In this case also, due to the amount of bone loss and also due to the anatomy of the defect, no regeneration was attempted, rather a reconstructive approach was followed, and the furcation area was obliterated using light cure glass ionomer cement (Fig 8). The flaps were then replaced in their original position and sutured.

Reevaluation at the end of 3 months revealed absence of gingival inflammation (Fig 9) and reduction of probing depth from 6 mm to 3mm. The tooth was in function and the patient was asymptomatic.

DISCUSSION

Predictable regeneration in teeth with grade III furcation involvement still remains an elusive goal. Even after initial resolution of inflammation following surgery, the furcal area is not easily accessible to the patient for maintenance of proper home care, and often leads to recurrence of symptoms.

In recent literature, some studies[4,5,6,7] have suggested the use of resin-ionomers in specific periodontal conditions, including grade III furcation involvement cases. Ever since their introduction to the dental profession in 1972, resin-ionomers have increasingly been used in restorations, cements, cavity liners, post-and-core buildups and preventive applications[8]. Certain resin-ionomer restorative materials possess properties that are biocompatible with periodontal tissues. This biocompatibility may be related to *antimicrobial activity of the fluoride release* from these materials that affects the composition of the bacterial plaque and plaque biochemistry by altering the carbohydrate metabolism [9,10]. Also studies have shown histologic evidence of epithelial and connective tissue adherence to the resin-ionomer restorative materials during the wound healing process when the material was used subgingivally[5]. Finally, some studies[4,6,7] have suggested that resin-ionomer can be considered as an ideal subgingival restorative material due to its properties of: biocompatibility, dual cure set, adhesiveness, fluoride release, absence of microleakage and near insolubility in oral fluids.

The results of the present study support the previous literature:

- The reduction in gingival inflammation, as observed at the end of 3 months, establishes the biocompatibility of the material.
- Also, the reduction of probing depths suggests some kind of epithelial and /or connective tissue attachment to this material
- Finally, the obliteration of the furcation entrance to bacterial and food debris invasion enables easier home care, thus making the site maintainable by the patient.

However, the study does have its limitations. For more clinical significance, a larger sample size needs to be evaluated. Also, more long-term follow-up of the cases is needed. Finally, the nature of epithelial connective tissue adherence to the material could not be established histologically in this study.

It needs to be mentioned that no attempts were made to regenerate the attachment apparatus. Rather, the objective was to give the patient a functional and asymptomatic tooth, which could be maintained plaque free by routine oral hygiene measures.

CONCLUSION

Within the limitations of the study, it can be concluded that light cure glass ionomer cement can be

considered an adjunct to conventional periodontal therapy, as well as an alternative treatment modality in cases with grade III furcation involvement. The biocompatibility of the material is evidence enough to warrant further research on the use of this biomaterial in periodontics.

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Conclusion

Crown fracture has been documented to account for upto 92% of all traumatic injuries to the permanent dentition. The number and extent of tissue involvement in the traumatic injury determine the management needs. Clinical crown lengthening in the anterior segment of the dentition requires a more elaborate and sophisticated diagnostic process, and treatment modality selection than CCL in posterior segment because the type of therapy chosen by clinician will have esthetic ramifications that are mostly irreversible. Hence it requires a complete understanding of wound healing and particular attention to detail so that a naturally occurring gingiva scaffold can be developed.

This case report illustrates that in traumatic injuries close to gingival third; the clinician should make a careful diagnosis and prepare for different treatment approach to maintain overall health of the tooth complex.

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