



Endodontic Management of Fractured Maxillary Incisors using Bioactive Mineral based root canal sealer

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Abstract

Fracture of anterior incisors are most common form of dental trauma. Retaining the available tooth structure and rehabilitating the tooth is of prime importance. Newer materials available possess great values in replacing the lost tooth form and improving the chances of longevity in the oral cavity. This clinical case reports the endodontic management of fractured maxillary incisor using bioactive mineral based root canal sealer.

Keywords: Bio root RCS, Incisor's, Trauma, Bioactive Sealer's

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Introduction

Aim of conventional root canal treatment is to remove viable micro-organisms, pulpal tissues, and filling the tooth with a filling material thereby protecting the periapical tissues and maintaining the resistance form of the tooth¹. 96% of the injuries involve maxillary incisor's, and rehabilitation of these are challenging^{2,3}.

Various factors affect the management of fracture's which includes extent of fracture i.e., coronal, middle or apical third, involvement of pulp space, root fractures', periodontal support, remaining dentin thickness(RDT) of the root canal if there is evidence of internal root resorption post traumatic impact⁴. Reconstruction of functional and aesthetic conditions of tooth in extensively damaged condition is technically sensitive procedure. Maintaining intracanal resistance and retention form also periodontal health of a tooth by using bioactive mineral based sealers becomes imperative^{4,5}.

Sealer's with poor dissolution resistance lead to ingress of micro-organism's failure of root canal treatment causing periapical inflammation. Endodontic sealer BioRoot™ RCS, that is based on tricalcic silicate materials benefiting from both Active Biosilicate Technology and Biodentine has proved to be efficient in completely sealing canal space⁶.

The present case report describes the endodontic management of fractured maxillary incisors using bioactive mineral based root canal sealer.

Case Report

A 23-year-old male patient reported with a chief complaint of discoloured, broken anterior tooth with history of trauma 10 yrs. ago. He is a daily wage worker with routine occupation of granite polishing. Upon clinical examination fracture was located up to cervical third, with blackish powdery discolouration of dentin in root canal space with purulent discharge and no history of pain [Figure 1and Figure 2]



Figure 1: Clinical examination reveals fracture up to cervical third



Figure 2

comparison to the collateral teeth .Direct digital radiograph revealed radiolucency with respect to 21 involving dentin, pulp chamber, pulp

space, periapical areasuggestive of internal resorption and apical periodontitis .Radiolucency involving pulp chamber with respect to 11 suggestive of internal resorption [Figure3].



Figure 3: Radiographic examination of 11and 21

Treatment options were discussed with the patient, endodontic treatment of 21 and 11 followed by post and core treatment and full crown rehabilitation. After obtaining patients consent under rubber dam(Op-

tra dam®, IvoclarVivadent) isolation local anaesthesia was administered, dusty dentinaldebriswere excavated and dentin was cleared of soft caries[Figure 4].

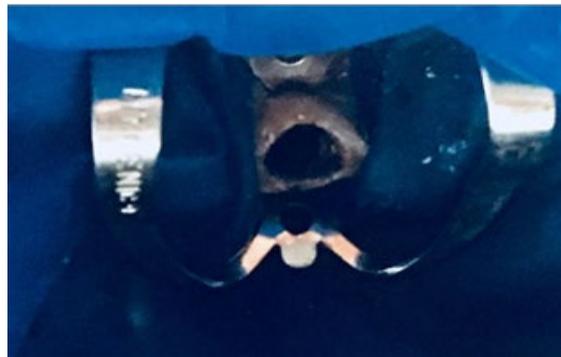


Figure 4: Rubber dam isolation (Optra Dam)

Access cavity was refined using high speed air turbine hand piece, working length estimation was done using apexlocator (DENTSPLY MAILLEFER® INDIA Propexpixi™). Pulpal debris and remnants were removed; chemo mechanical preparation was performed using Crown down technique with Protaper® (DENTSPLY MAILLEFER® INDIA) universal rotary file systems. SX-F3 6% 25mm files were used, with 0.1% chlorhexidine as irrigating solution. Laser disinfection was performed

with gallium arsenide laser (Kavo GentleRay 980, Biberach, Germany). Master cone was evaluated radiographically and obturation of canal was performed with Bio Root™ RCS sealer (Septodont, France). Sectional obturation was done using guttapercha, Plugged and condensed upto the canal orifice using Touch and Heat (KaVo, Biberach, Germany). A post-operative radiograph was taken to establish quality of obturation [Figure 5].



Figure 5: Post obturation radiograph

Subsequent appointment after the obturation, post and core treatment was performed using Luxacore (DMG, Hamburg Germany). Post space preparation was done and the canal was pre-treated with etchant (37% H₃PO₄) and bonding agent (G-Premio BOND™, GC America), surface of Fiber post (Angelus Reforpost Fibre Glass Londrina,

Brazil) was pre-treated with DMG's silane coupling agent to enhance bonding between glass post and resin matrix, fiber post was cemented, followed by core build-up. Adjacent Central incisors were endodontically treated, due to presence of internal resorption. Patient was recalled after a week to evaluate the status of the tooth. Further full crown rehabilitation was done. [Figure 6]



Figure 6: Post endodontic restoration done

Discussion

Bioactive and bio ceramic based sealers provide 3-Dimensional seal of root canal increasing the potential and obtaining more reliable results post obturation. These materials have unique antimicrobial and biocompatibility, possess mineralization potential of periapical tissues⁸. Their hydrophilic property is one that proves its efficiency to be used in dentin, even though dentine is made up of 20% of fluid and a dynamic tissue itself. Due to excellent wettability, lower viscosity and high quality sealing is obtained⁹.

Active stimulation of bone, mineralization, adhesion to dentine, in-

cluding biocompatibility, hydroxyapatite formation, alkaline pH and mineralization dental structure makes tricalcium mineral based Bio Root™ RCS an efficient sealer.

Remain dentin thickness plays an important factor in preserving the resistance form of the tooth. Obtaining optimal bonding between dentin and sealer is important to sustain the load bearing capacity of tooth, therefore a material that bonds and replaces the dentin is always preferred in such cases. Thus, endodontic practice with efficient root canal sealers prevent failure outcome and enhances tooth resistance form¹⁰.

Conclusion

A successful endodontic treatment is complete only when canal is completely debrided and smooth tapered canal is restored with gutta-percha and sealer that doesn't shrink, degrade. Bio ceramic based endodontic sealers overcomes all the disadvantage of traditional sealer's. Thus, this material will prevent recurrent infection, proving adequate seal, adhesion to remain dentin, preserves coronal dentin and thus meeting all the major objectives of 3D seal.

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