

Managing Subgingival Fracture with a Multidisciplinary Approach -A Case Report

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ABSTRACT

This case report is a multidisciplinary approach using orthodontic extrusion to provide restoration of a sub gingivally fractured maxillary permanent left central incisor. A 38-year-old male patient came with history of trauma to front tooth leading to fracture due to its unaesthetic appearance and for its management. When clinical examination was done, it was observed that maxillary left central incisor had oblique fracture with fractured mobile fragments. Along with orthodontic forced eruption, crown lengthening was done to provide adequate ferrule. Fiberpost was placed, and final restoration was placed. Follow-up till 12 months revealed good esthetics, good periodontal health, and proper function of tooth.

INTRODUCTION

Extrusion of a tooth is the movement of tooth occlusal to the normal occlusal plane¹. Surgical extrusion is intentional coronal displacement of the root within the socket to make the tooth restorable². For prosthetic rehabilitation, an adequate ferrule is required. The presence of 1.5-2 mm of supragingival tooth structure is needed to provide adequate ferrule to increase tooth fracture resistance. Root extrusion can be conducted orthodontically to provide adequate ferrule³. These options are available: crown lengthening, surgical extrusion, and orthodontic extrusion⁴. When clinical crown lengthening is done in the maxillary area by different techniques, there are limitations in aesthetics⁵. Crown lengthening method can be used in situations such as teeth with short crown or destructive crown. Three methods can be used in clinical crown lengthening- surgical crown lengthening, surgical extrusion, and orthodontic extrusion⁶. Clinicians need to select the best technique for desirable results. A multidisciplinary approach involving endodontics, periodontics, and orthodontics, is required for cases with complex conditions like crown-root fracture etc. Orthodontic extrusion is then followed by crown lengthening surgically, to maintain an appropriate crown-root ratio and aesthetics of maxillary central incisor⁷. Crown lengthening although causes removal of a part of bone and is invasive, but it is an effective technique to preserve tooth structures of fractured teeth and lead to improved aesthetics⁸. Previous studies documented orthodontic extrusion success at follow-up of long periods. Farmakis et al observed that after 7–10-year follow-up, clinical or radiographic interpretations didn't show any signs of inflammation^{8,9}. Another study considered this as a conservative technique to restore a damaged tooth and to preserve a natural tooth^{10,11}. As nothing can replace the natural but the natural, this case report is aimed to show that a simple orthodontic technique followed by crown lengthening is effective in saving a severely damaged tooth and fulfil aesthetic requirements.

CASE-REPORT

A 38-year-old male reported with a history of trauma to the out-patient department of conservative dentistry and endodontics, for treatment of his traumatized upper left front tooth which occurred the previous day by an accidental fall. According to the new Traumatic Dental Injury classification of the World Health Organization the injury can be classified as NA0D.0512. On clinical and radiographic examination, the fracture was oblique and involving the pulp (Ellis class III subgingival fracture) in the crown of maxillary left central incisor. Radiographs preop and after fracture segment removal (Figure 1-a and 1-b). Clinical photos revealing fracture fragments and remaining tooth structure after fragment removal (Figure 2-a and 2-b)

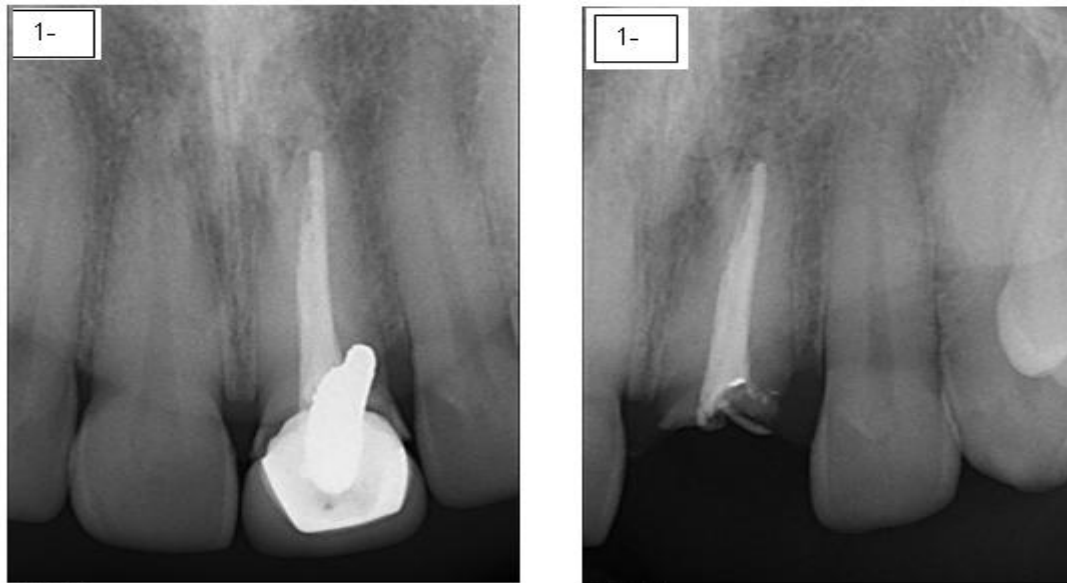


Figure 1-a-Radiographs preop and 1-b after fracture segment removal.

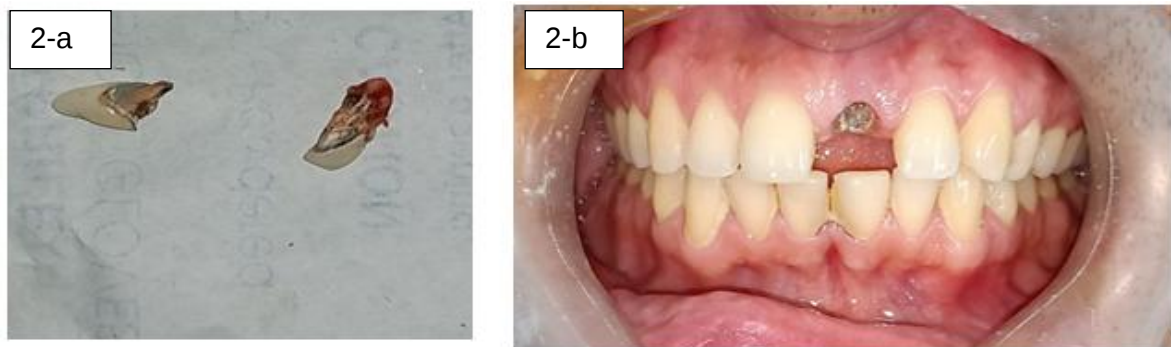
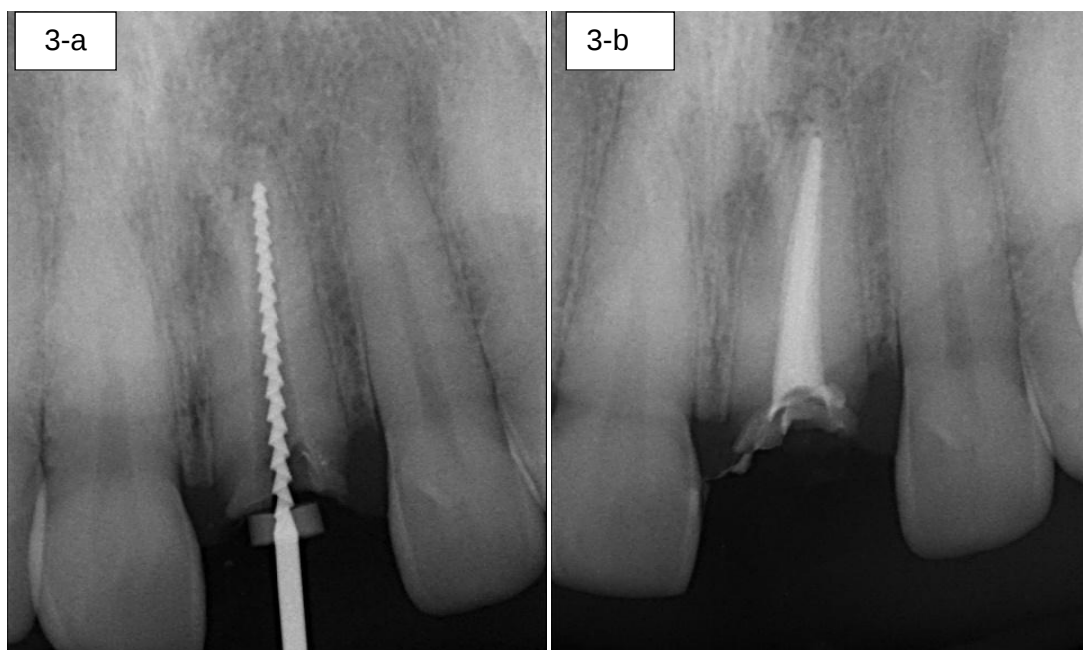


Figure 2-a-Clinical photos revealing fracture fragments, and 2-b and remaining tooth structure after fragment removal. As the root canal treatment (RCT) was performed 15 years back, re-RCT was done by GP removal and obturation was done using lateral condensation (Figure-3-a and 3-b). Post space was created using peeso reamer and fibre post was placed using resin cement(Figure-4-a and 4-b). Composite build up was done to facilitate orthodontic band placement (Figure-5).



Figures-3-a- GP removal, 3-b-reRCT done.

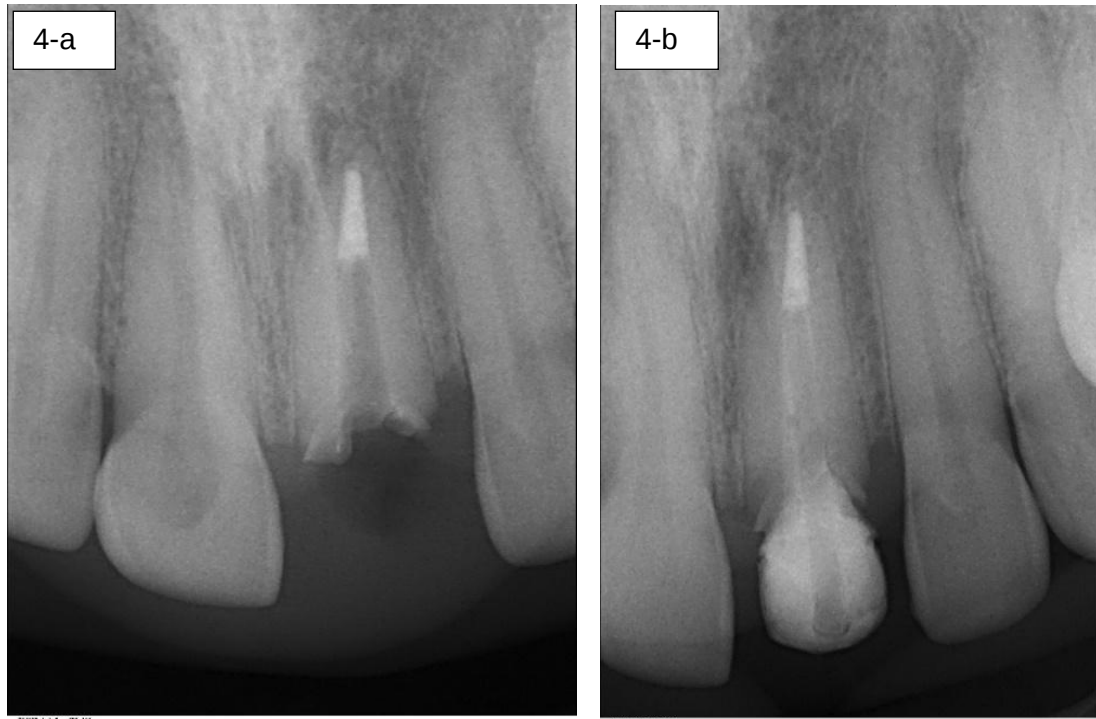


Figure-4-a -Post space was created using peeso reamer and 4-b fibre post was placed using resin cement.



Figure-5- Composite build up was done to facilitate orthodontic band placement .

Orthodontic extrusion was done by using a wire assembly after composite build up for 8 weeks. Horizontal loops were placed in line with the tooth to be extruded. Elastic module was engaged to loops on either side. Every 15th day module was changed until the desired extrusion of 2 mm was achieved.



Figure-6- a & b -Orthodontic band and wire assembly placement for orthodontic extrusion, 6-c-Orthodontic extrusion achieved.

As the orthodontic treatment was achieved, there was coronal displacement of gingiva. Crown lengthening was done surgically and gingival recontouring was done depending on aesthetics.

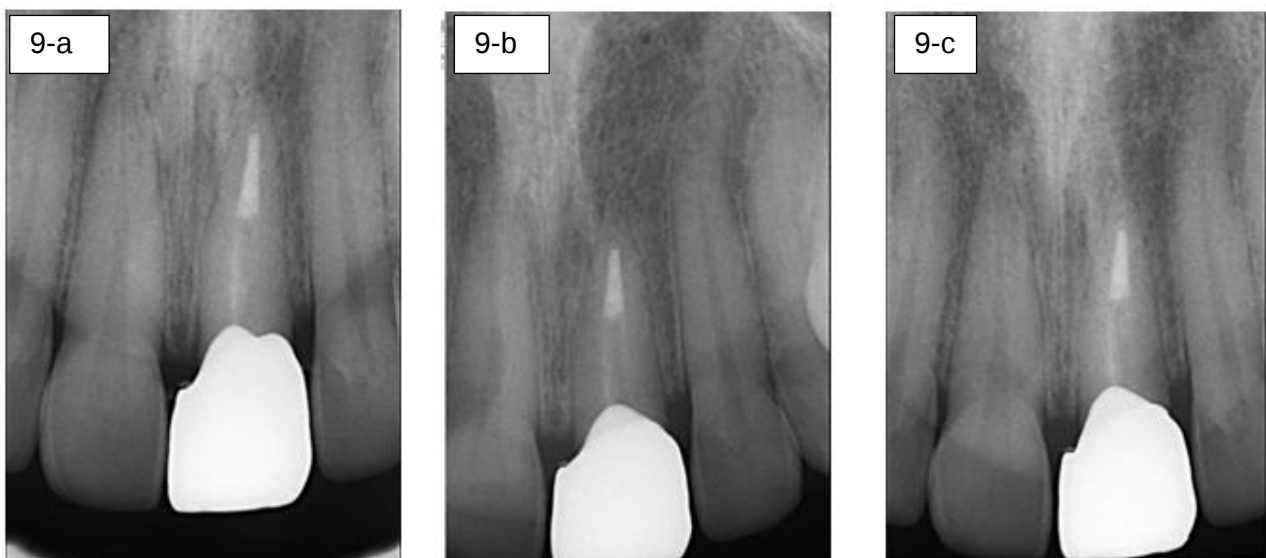


Figure-7- a , b & c- Crown lengthening and gingival recontouring.

Zirconia crown was placed after crown preparation and follow-up was done at 6- and 12-months.



Figures 8-Clinical view a)-post operative, b)-6-months follow-up& c)-12-months follow-up.



Figures 9-Radiographic view a)-post operative, b)-6-months follow-up& c)-12-months follow-up.

DISCUSSION

Subgingival fractures are difficult to restore and present a challenge to endodontists. Method of treating them is to remove the fractured fragments and then exposing the fractured margins for further treatment. Prognosis also depends on the oral hygiene maintained by the patient¹³. The treatment requires a multidisciplinary approach from endodontics, periodontics and orthodontics¹⁴. Different treatment options are available that depend on extent of bone level around root , remaining tooth structure etc. Extraction should always be the last option as nothing can replace the natural but the natural and every effort should be made to preserve a tooth¹⁵. An orthodontic extrusion leads to forced eruption of the damaged tooth and thus expose fractured margins, facilitating proper final restoration placement^{15,16}. At the end of orthodontic extrusion there was some difference in gingival margin levels, so periodontal crown lengthening was done for gingival recontouring and providing better aesthetics.

In this case orthodontic extrusion followed by crown lengthening and then, final crown placement was done to preserve the natural tooth. The fibre post placement ensures best retention and long-term stability of the final restoration.

CONCLUSION

Both orthodontic extrusion and crown lengthening can be used successfully for the treatment of severely damaged tooth. Orthodontic extrusion is a method of choice if a highly predictable treatment is desired. Further studies are required with long term follow-ups.

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