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Case Report

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Survival of a grossly decayed premolar; novel technique of surgical extrusion for faster clinical crown lengthening: a case report

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ABSTRACT

Clinical crown lengthening can be brought about by surgical gingivectomy, orthodontic extrusion of tooth or surgical extrusion of tooth. This technique allows us to extrude the root, in a single visit, short period of time without violating the biological width. Following is a case requiring clinical crown lengthening where novel technique of surgical extrusion is demonstrated along with the treatment outcome along with one and eight months follow up. A 38 year old female patient reported to dental clinic with a chief complaint of decayed upper left tooth accompanied with no pain. Upon examination, grossly decayed premolar (24) was present. The line of treatment followed in the conservative option was to save the natural tooth by extruding the tooth following which root canal treatment with a suitable post endodontic restoration was performed. The absence of any periodontal or periapical pathology, well formed root with absence of symptoms, adequate crown and root ratio, absence of any systemic condition and a fairly young age promoting healing recommended the use of surgical method to gain length of crown followed by RCT and a suitable post endodontic restoration which further showed no clinical or radiographic symptoms reappearing in 8 months post operatively. Thus, with appropriate diagnosis, and absolute indications, surgical extrusion proves to be atraumatic, faster, conservative, cost effective and functionally stable method of gaining crown height, in grossly destructed tooth.

Keywords: Extrusion, Surgical, Crown lengthening, Grossly decayed, Splinting

INTRODUCTION

There are numerous debated clinical procedures, routinely performed in dentistry. One such

procedure is “clinical crown lengthening”. Clinical crown lengthening has been known to be achieved to procure an increment in the clinical crown height

so as to enable it to receive suitable restorative treatments thereafter.

It can be achieved by a variety of techniques, most of which are associated with either aesthetic and functional limitations or an elongated duration of time. For example, clinical crown lengthening can be brought about by surgical gingivectomy around the tooth margins, orthodontic extrusion of tooth or in rare cases, surgical extrusion of tooth.

In cases, where surgical gingivectomy is contraindicated due to possibility of violation of the biological width and orthodontic extrusion is not possible due to tie constraint, clinician might need to resort to other methods to bring about clinical crown lengthening in interest of the patient. One of such methods is "surgical extrusion of the tooth". Surgical extrusion, also called intra-alveolar transplantation was first described by Tegsjo in 1978. [1] The technique is based on the fundamentals of healing process occurring post re-implantation of the tooth after avulsion [2, 3] and auto transplantation. [4, 5]

This technique allows us to extrude the root, in a single visit, short period of time without violating the biological width. However there are some absolute contraindications; for e.g. presence of systemic condition that contraindicates surgery, patient on a long term biphosphonates therapy, presence of ankylosed root and risk of furcation exposure, high risk of root fracture during the tooth

luxation, crown root ratio equal or less than 1:1. [6-10]

While few indication of surgical extrusion are as follows:-

1. Crown-root fractures
2. Sub-gingival caries
3. Cervical root resorption
4. Large radicular perforations of the coronal third of the root where other therapeutic solutions have failed.
5. Prosthetic preparations that violate the biological width

Following is a case requiring clinical crown lengthening where novel technique of surgical extrusion is demonstrated along with the treatment outcome.

CASE REPORT

A 38 year old female patient reported to dental clinic with a chief complaint of decayed upper left tooth accompanied with no pain. Upon examination, grossly decayed premolar (24) was present. No pockets were seen in with respect to 24. There was no history of pain or relevant medical history or any known allergies. Patient gave a history of minor fillings and few extractions of posterior teeth in past due to extensive dental caries. The pre-operative clinical and radiographic appearance of decayed tooth (24) is shown in figure 1 and 2.



Figure 1 : Pre-operative clinical image

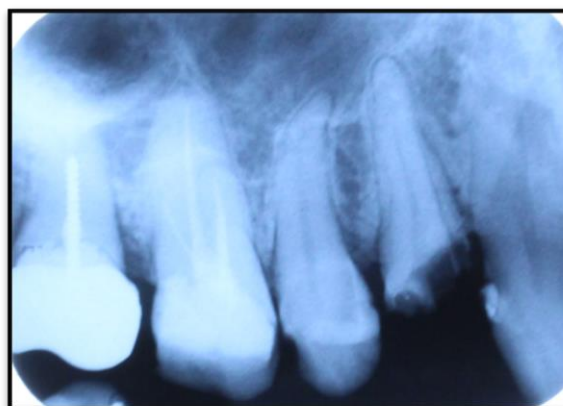
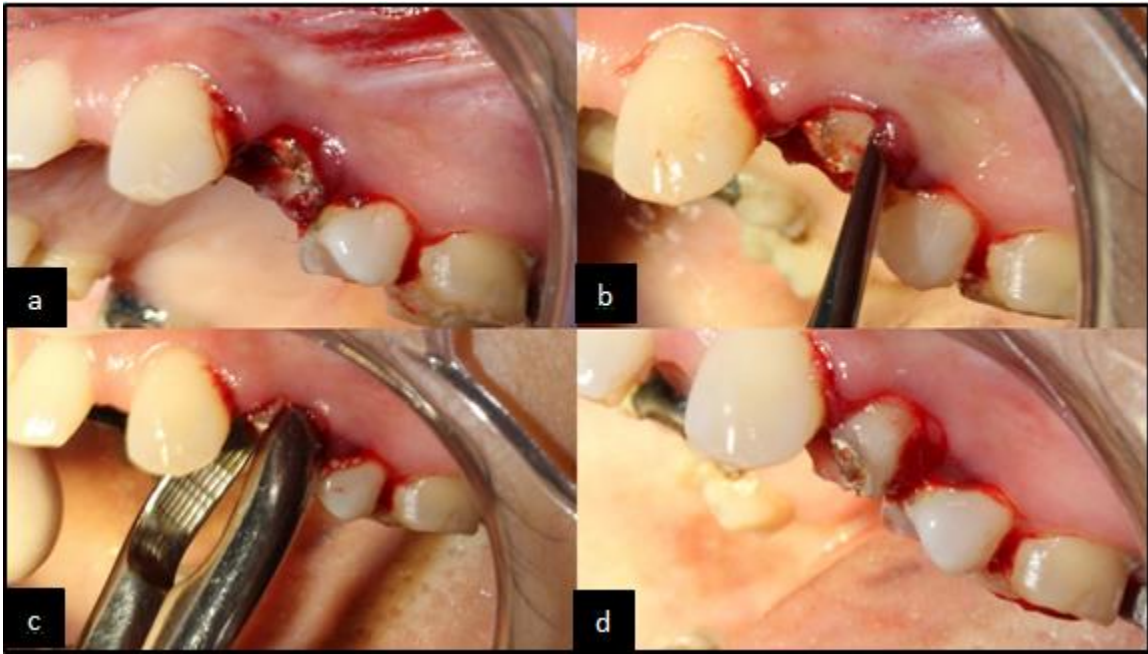


Figure 2 : Pre-operative radiographic image

Vitality tests were performed using heat, cold and electric pulp tester. With, all the tests, tooth in question gave no response suggestive of non vital pulp. Thus, the final diagnosis was grossly decayed tooth with non vital pulp associated with no

periapical pathosis. The patient was given radical and conservative treatment options for which patient went ahead with conservative treatment option.



**Figure 3 : a,b: Wedging of tooth with periosteal elevator
c: Use of forceps
d: Extruded tooth to the required height.**



**Figure 4: a,b: Simple interrupted sutures: buccal view
c: Sutures, Occlusal view
d: Fibre reinforced splinting**

The line of treatment followed in the conservative option was to save the natural tooth by extruding the tooth following which root canal

treatment with a suitable post endodontic restoration would be performed. Due to expressed time constraint of the patient, decision to surgically

extrude the tooth was taken. To assess the amount of decayed tooth structure, an emergency access opening was done and tooth was temporised, following which tooth was surgically extruded. (Figure 3). The surgical process was started under local anaesthesia, followed by reflection of gingival locally and wedging the tooth using periosteal elevator.(figure 3,b). Finally positioning of maxillary forceps (figure 3, c) at the level of CEJ was done with gentle force to extrude the tooth vertically to gain sufficient clinical crown height

compensating for the removal of caries over the occlusal surface of tooth which would be done prior to performing root canal therapy. Figure 3,d shows the final level of surgical extrusion after which the tooth was stabilised using simple interrupted sutures around the tooth and fibre reinforced splint cemented with flowable composite (Filtek™ Z350 XT, Flowable restorative, 3M ESPE) for ten days. Figure 5 shows the radiograph of the extruded tooth after the surgical extrusion process.

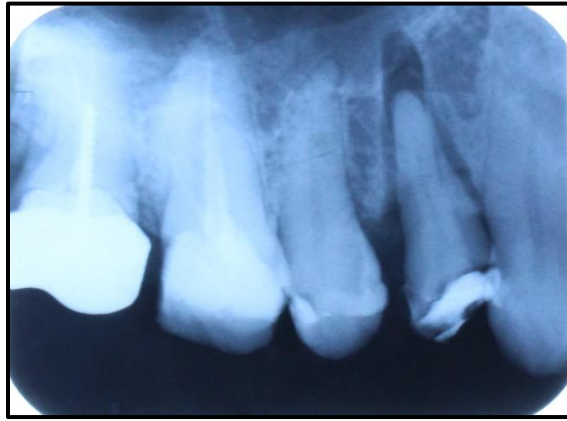


Figure 5: Post extrusion radiograph

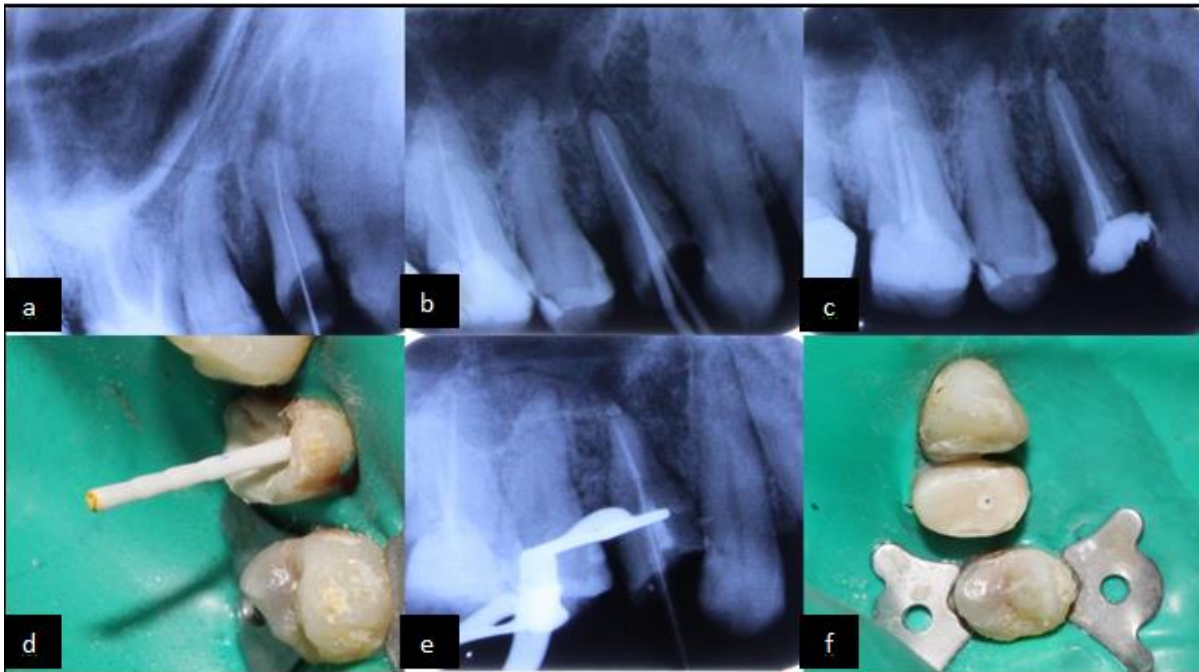
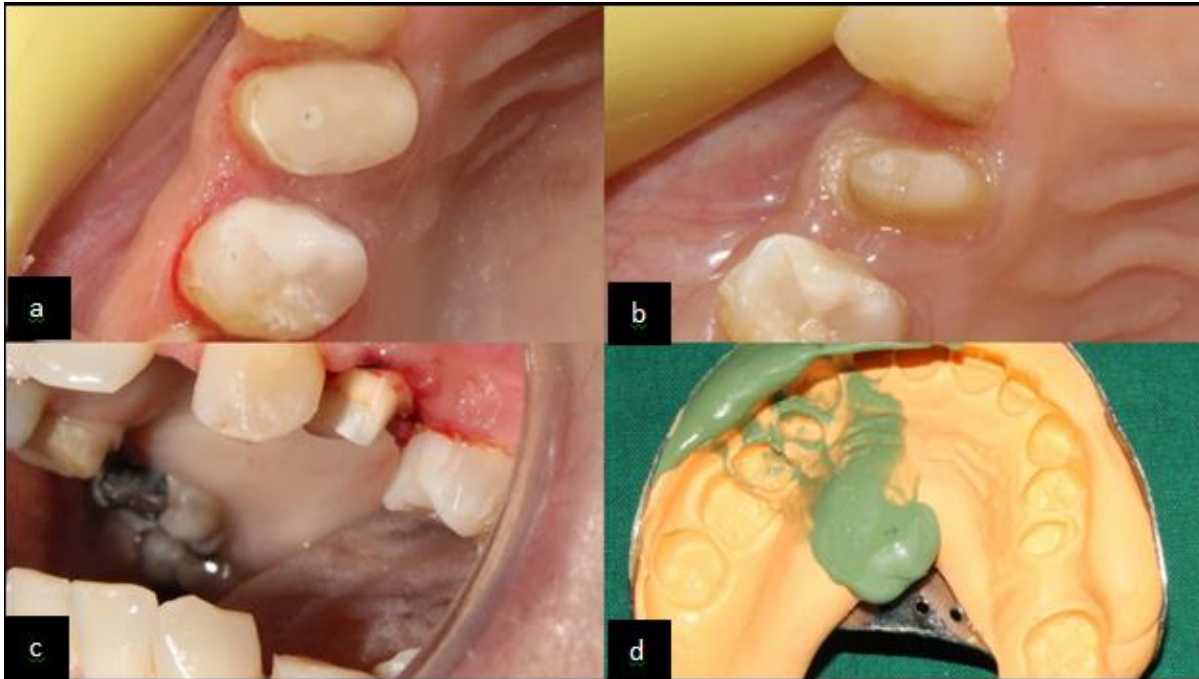


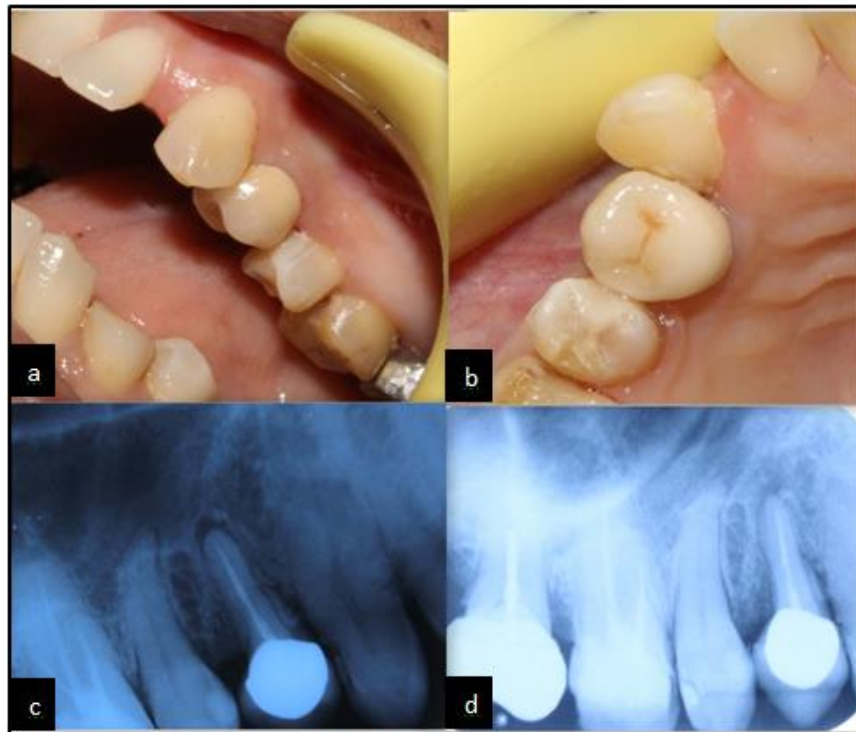
Figure 6 : a: Working length radiograph
b: Mastercone radiograph
c: Obturation radiograph
d: Glass fibre post cementation
e: Glass fibre post radiograph
f: Composite core build up

Endodontic treatment was done as shown in figure 6a, 6b and 6c followed by glass fibre post cementation using resin cement (SpeedCEM Plus, Ivoclar Vivadent) and final core was built up using composite (Filtek™ Z350 XT, universal restorative, 3M ESPE). (Figure 6d, 6e, 6f). Finally, tooth was prepared to receive full coverage

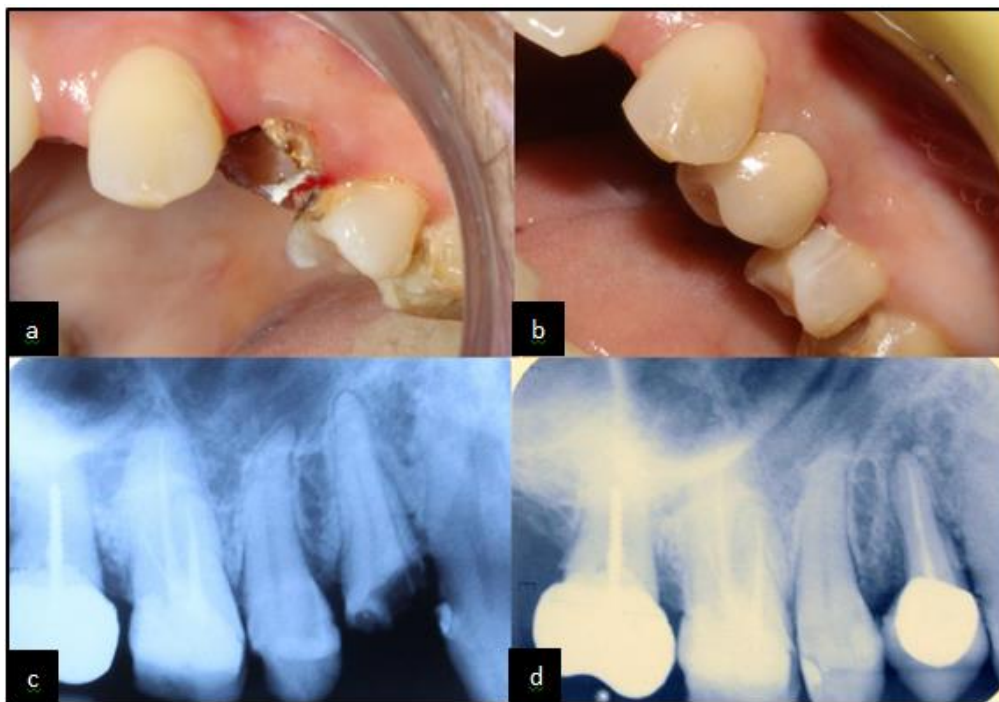
restoration and impression was made. (Figure 7) Porcelain fused to metal (PFM) crown was cemented with Type 1 Glass Ionomer Cement and flash was removed. (Figure 8a, 8b) Follow up radiographs were taken at one month and 8 months interval. (figure 8c, 8d)



**Figure 7 : a: Post endodontically restored tooth with core material
b: Tooth preparation for PFM crown ; occlusal view
c: Tooth preparation ; buccal view with retraction cord
d: Impression of the prepared tooth**



**Figure 8: a: Crown cementation; buccal view
b: Crown cementation ; occlusal view
c: Follow up radiograph ; one month
d: Follow up radiograph ; eight months**



**Figure 9: a: Pre operative clinical image
b: Post operative clinical image
c: Pre operative radiographic image
d: Post operativeradiographic image - eight months**

DISCUSSION

In the present case, most conservative treatment option which complied with patient's requirements of a faster treatment was followed. However, other treatment options include:

- Orthodontic extrusion of compromised tooth followed by RCT
- Gingivectomy followed by RCT
- Extraction followed by implant /fixed removable prosthesis(FPD)

Orthodontic extrusion is a less aggressive and radical approach to bring about clinical crown lengthening but consumes time. The time constraint in the present case did not advocate use of orthodontic extrusion as the choice of treatment modality.

Another option to increase the length of the clinical crown is gingivectomy. The procedure is advocated if, there is no intrusion of the biological width, however in the present case, keeping in account the presence of dental caries approaching root surface, it was necessary that more amount of tooth structure should be extruded which if performed using gingivectomy, would have encroached upon the biological width leading to failure of the treatment in the long run.

Among the conservative treatment options, the last resort to increase crown height remained surgical extrusion, which was fairly well indicated in the present case. The absence of any periodontal or periapical pathology, well formed root with absence of symptoms, adequate crown and root ratio, absence of any systemic condition and a fairly young age promoting healing recommended the use of surgical method to gain length of crown

followed by RCT and a suitable post endodontic restoration.

Extraction was not undertaken since the patient was interested in saving the natural tooth and understanding the benefit of saving tooth in comparison to extraction followed by implant placement and losing a tooth along with bone architecture. The treatment followed in this case delayed, implant placement thus preserving the alveolar bone. The time required and the cost factor of implant placement [11] made extraction a non viable treatment option for the patient in this case. Few reasons that implant was not advocated in this case, include the risk of peri-implantitis and implant failure. [12, 13]

There have been various authors recommending surgical extrusion for crown lengthening and showed that procedure provided a predictable outcome. However, there are various factors that determine the prognosis [8, 9, 14, 15]

- Type and period of splinting
- Amount of trauma to pdl cells during extraction technique
- condition and maintenance of the gingival tissues
- Appropriate endodontic therapy
- Operator skills

CONCLUSION

With appropriate diagnosis, and absolute indications, surgical extrusion proves to be atraumatic, faster, conservative, cost effective and functionally stable method of gaining crown height, in grossly destructed tooth.

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