

Repair of Accidentally Perforated Labial Wall of a Central Incisor Having Failed Root Treatment – A Case Report

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Abstract This is a successfully managed clinical case report of a young lady whose tooth # 11 was root treated in 2010 which reinfected after three years. The root treatment was repeated but was iatrogenically perforated because of the operating dentist's error. The tooth was therefore opened for surgical correction. During the procedure, it was found that labial wall of the tooth was missing in the mid-root area. The labial wall was built using glass ionomer cement keeping the endodontic file in the canal to avoid obliteration of canal space by glass ionomer. The rebuilt canal was treated with Calcium Hydroxide dressings at an interval of 7 days. In two weeks as the sinus healed, swelling subsided and the canal became effortlessly dryable using just two absorbent points, the canal was obturated with a custom made gutta percha cone, employing glass ionomer as a canal sealer.

Keywords: root perforation, endodontic procedural errors, iatrogenic perforation

Cite This Article: Asaad Javaid Mirza, Khalid Shafiq, Maaz Asad, and Shaheen AbuBakar, "Repair of Accidentally Perforated Labial Wall of a Central Incisor Having Failed Root Treatment – A Case Report." *International Journal of Dental Sciences and Research*, vol. 4, no. 3 (2016): 49-51. doi: 10.12691/ijdsr-4-3-4.

1. Introduction

Root perforation is an unnatural communication between root canal system and its periodontal apparatus of an affected tooth. It occurs due to radicular pathology or as consequence of procedural error by the dentist [1]. The procedural mistake (iatrogenic perforation) may happen during access preparation, canal location, canal instrumentation or post -space creation [2] in 2-12 % of endodontically treated teeth [3].

The clinical case report presents the management of accidental perforation which took place when the dentist attempted to remove the root filling done three years ago.

2. History

A 21-year old female was referred to outpatient department of Endodontic division at Baqai Dental College Hospital. The patient's chief complaint was pain and swelling in the region of her upper anterior teeth (Figure 1). Her physical and mental health was sound and medical history was non-contributory. On the contrary, the Past Dental History she narrated was attention-grabbing. It revealed that she underwent root treatment of the tooth # 11 in 2010 and was referred to the Orthodontic Department for alignment of her misaligned teeth. On completion of Orthodontic treatment in three years, she developed infection in the same tooth again. The patient came back to the Endodontic division where RCT was repeated by some junior doctor.

The patient remained symptoms free for a period of 4 months after the redoing when she felt tenderness and slight swelling in the same area. She also complained of persistent but insignificant salty taste. Intraoral examination showed a draining sinus on the labial gingival mucosa opposite to mid-root area and grade -2 mobility of tooth # 11. Extraoral examination did not divulge any abnormality except minor swelling of upper lip. The perforation in the root apical to crestal bone was apparent on the Periapical I/O radiographs (Figure 2) but damage to labial wall was not detectable as diagnostic value of a radiograph is restricted in case of palatal or labial wall destruction [4].



Figure 1. Draining sinus & upper Lip swelling

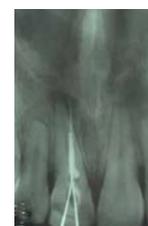


Figure 2. Root perforation apical to bone crest visible

3. Treatment

Patient's consent was taken for surgical correction of the midradicular perforation. A trapezoidal flap was raised exposing maxillary bone from distal aspect of tooth #11 to distal aspect of tooth #21. Previously filled gutta percha was clearly evident (Figure 3) which was removed using 'H' file and Gates Glidden burs. Working length was reestablished (Figure 4) and canal was apically prepared with size 80 of 'K' file. A custom made Gutta Percha (GP) (Diadent, Korea) cone was prepared by slightly heating and rolling multiple GP points (Figure 5) in between two clean glass slabs. The marginally loose GP was trial tested in the prepared canal and preserved in an empty container of GP points. The middle part of labial wall of the root of tooth # 11 was so extensively damaged that the file inserted into the canal was openly visible (Figure 6). It required build up. Leaving the file in the canal up to full working length, conventional glass ionomer cement (Fuji GC, USA) (GIC) was used to construct the lost part of labial wall (Figure 7). To enhance bonding between GIC and damaged root and reconditioning of root surface a two minutes application of citric acid was performed. This application is recommended to etch diseased root surfaces in order to facilitate formation of new attachment and cementogenesis [5]. After rock-hard setting of GIC, the flap was sutured back in its place. The patient was advised rest for 24 hours with Capsule Amoxicillin 250 mg every 8 hourly for five days and Tablet Ibuprofen 400mg every 12 hourly for two days. Sutures were removed after five days after which Calcium Hydroxide treatment of the canal was performed using non-setting calcium Hydroxide (Pulpdent Corporation). The Calcium Hydroxide dressing was changed on 7th and 14th days until the canal became easily dryable using merely two absorbent points. Each absorbent point was left in the canal for 15 seconds. Surgical wound and sinus tract also had healed. The canal was then obturated with the preserved GP as core material and glass ionomer based sealer (3 M ESPE) as sealing material in a conventional manner. This technique helped to fill GP without applying any pressure for condensation. Application of any pressure might have caused failure of the constructed labial wall. The access -opening was filled with resin composite.



Figure 3. Previously filled GP visible after flap reflection



Figure 4. New working established. Big apical radiolucency is visible



Figure 5. Custom made GP cone



Figure 6. Extensive loss of labial wall showing inserted file



Figure 7. Wall fabricated using GIC

In a follow up after eight months, it was observed that the patient was clinically comfortable having no intra or extraoral sign and symptoms (Figure 8). Radiographically, periapical radiolucency had decreased as bone was seen forming around the apex (Figure 9).



Figure 8. Patient feeling comfortable after wound healing



Figure 9. Tooth standing firm with reduced radiolucency after eight months

4. Discussion

Radicular perforations if left untreated, have many complications which may lead to inflammation of periodontium with eventual loss of the tooth [6]. Majority of perforations occur in maxillary anterior teeth involving labial walls [7]. Also in this case, perforation occurred

through the labial wall which like other such perforations, posed a challenge in diagnosis and its management [8]. Another reason for electing surgical repair of this case was location of the perforation. The perforations on cervical third of a root have adverse effect on the prognosis [9]. Moreover, perforations occurring closer to alveolar bone crest is highly perilous and have poor prognosis as they create a periodontal defect [10] but those apical to crestal bone have better success rate if endodontic treatment is of high quality as it reduces the chances of producing periodontal pockets [11]. In this case, as the perforation was apical to crest, best efforts were exercised to attain an unblemished root treatment.

The other difficulties faced during the accomplishment of the case were; controlling hemorrhage, selecting material for the lost wall fabrication, keeping the patency of root canal space intact and finally hermetic obturation without condensation pressure.

Hemorrhage control is very important not only to keep the operating sight clearly visible but also to avoid contamination of the restorative material during unset state. In this case GIC – a very technique sensitive material was used for rebuilding the labial wall. Minor contamination with blood might cause failure of the optimal properties GIC gives in a perfectly isolated condition. It was therefore mandatory to attain bloodless field. To achieve this, a gauze pellet soaked in 0.5 % Povidone Iodine was placed in the periapical cavity for a minute and then the wound was flooded with normal saline [12].

A variety of biorestorative material have been tried and tested for managing root perforations. Glass ionomer is one of the materials used with abundant success as its properties highly suit such applications. It is frequently used for retrograde obturation, closing of perforations, especially those located in the cervical third, where use of adhesive restorative materials has been recommended [13]. While using glass ionomer for wall construction, there was a danger that having good flowing property, it will occupy the canal space and obliterate the canal. To overcome this issue, a thick endodontic file with slight coating of cocoa butter to avoid its adhesion with glass ionomer, was kept in the canal space to the full working

length. Once the glass ionomer set hard, the file was retrieved gently as patency of the canal was thus maintained. Using any condensation pressure during obturation would have been detrimental. The newly built labial wall might have crumbled under the condensation force. This problem was resolved with the use of a custom made GP cone prepared while the canal was open, easily accessible and visible with the naked eye. The slightly loose fit cone when loaded with GIC based sealer fitted well inside the canal.

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