



TRUSS ACCESS - A MINIMALLY INVASIVE ACCESS CAVITY DESIGN IN A LOWER FIRST MOLAR: A CASE REPORT

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ABSTRACT

This case report takes on a conservative approach to access opening with regard to a lower first molar advised to undergo a root canal therapy. The patient in discussion was a 29-year-old female with a chief complaint of severe sensitivity of the right lower first molar with a carious lesion of the distal surface including the distal marginal ridge involving enamel and dentin along with pulp exposure. With a principal aim of retaining maximum amount of healthy tooth structure, the root canal treatment was carried out in a single visit using a minimally invasive technique of access opening, and satisfactory chemomechanical preparation followed by a direct composite restoration.

KEYWORDS: Conservative approach, access opening, minimal invasive dentistry.

INTRODUCTION

An upcoming and widely accepted principle in modern dentistry, following the principle of “conserve to preserve”, minimal invasive dentistry has served various advantages such as selective removal of carious lesions and reduced incidences of post restorative fracture of enamel. Conveniently applied in the field of endodontics, a minimally invasive approach to access openings serves the vital purpose when it comes to preserving maximum amount of healthy tooth structure.

CASE REPORT

A 29-year-old female patient reported to the dental clinic with severe sensitivity in the right lower back tooth region. Intraoral examination revealed a carious lesion involving the distal surface and distal marginal ridge of the right lower first molar [Figure 1]. A diagnostic radiographic examination showed a diffuse radiolucency involving the enamel, dentin, and distal pulp horn. [Figure 2]



Fig 1: Pre-operative clinical photograph.



Fig 2: Pre-operative radiograph

Access Opening

An access opening was initially prepared from the occlusal surface exactly overlying the mesial pulp horn, post the delivery of local anesthesia and isolation with rubber dam. The access to pulp chamber was gained from occlusal surface to roof of the pulp chamber by orienting the bur parallel to the long axis of the tooth in oval shape buccolingually with an Endo access bur (Dentsply/Maillefer bur size no #2). Similarly, an access opening was also created over the distal pulp horn, thus completing the 'Truss Access' [Figure 3]. An Endo Z bur was used inside the pulp chamber at high-speed rotation creating a divergent walls in the access cavity

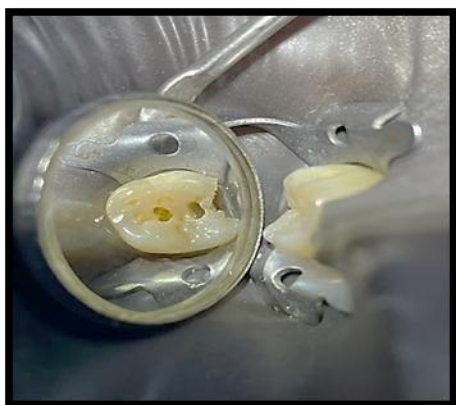


Fig 3: Access cavity preparation over mesial and distal pulp horns.

Exploration

The root canal was explored using 5.25% sodium hypochlorite solution with a 21-mm long, precurved, K-file size #10 (Dentsply/ Maillefer). Initial insertion was carried out with watch-winding motion until it reaches the root apex.

Chemomechanical preparation

Chemomechanical preparation was performed under irrigation with 5.25% sodium hypochlorite. Cervical preflare of the canal orifice was carried out with Gates-Glidden bur sizes #2 and #3 [Figure 3]. The working length was measured using coltene canal pro apex locator. The three canals are mesiobuccal, mesiolingual, and distal had a working length of 18 mm from the coronal reference point [Figure 4]. The cleaning and shaping of the root canals were done with ProTaper Universal Rotary Files (Dentsply/Maillefer). The shaping of the coronal 2/3rd of the root canal is done with SX-S2 and finishing was done with F1-F2 in brushing motion. Irrigation was performed with alternating 5.25% sodium hypochlorite and Endo prep RC (15% EDTA and 10% carbamide peroxide) followed by saline irrigation. Hand, as well as ultrasonic agitation, was done with 5.25% sodium hypochlorite to remove the pulpal tissue so as to have a proper disinfection of the root canals.



Fig 4: Working length determination of the canals.

Obturation

Post drying the canals with absorbent paper points (DiaDent). A master gutta-percha point of F2 0.6 taper of length 18 mm was placed and the radiograph with the canals possessing their respective master cones was taken [Figure 5]. Then, sealapex root canal sealer was mixed according to the manufacturer's instruction and inserted into the root canal together with the gutta-percha point to the working length. The excess gutta-percha at the canal orifice was then eliminated and the access cavity was anatomically restored using high strength composite restoration [Figure 6], post which a post-operative radiograph was taken confirm ample bulk and contour of the restoration [Figure 7].

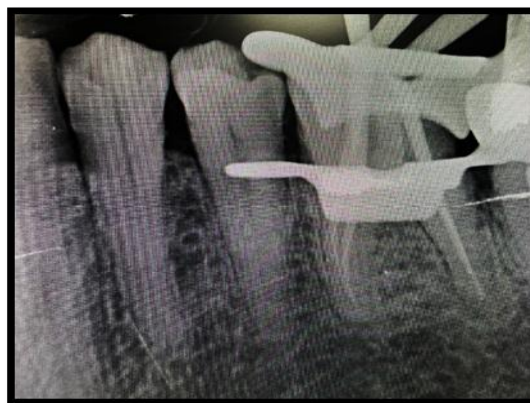


Fig 5: Master Cone radiograph.



Fig 6: Post-operative clinical photograph.



Fig 7: Post-operative radiograph.

DISCUSSION

Root canal treatment is the most effective and recommended treatment protocol currently followed the treatment of pulpal and periapical pathology. While accurate diagnosis and elimination of the etiopathological agents are the keys for a successful endodontic treatment, adequate illumination and magnification aid in the identification and removal of caries. This in turn acts as an adjunct to preserve the utmost amount of healthy dental tissue during endodontic treatment. Root canal treatment mainly relies on thorough cleaning and disinfection of root canals and obturating it with biologically compatible materials.^[1] Conventional root canal preparation gains a straight line access to the root canals that inevitably results in excessive loss of tooth structure which may affect the rigidity of the tooth.^[2] As a result of this, the resistance of the tooth to fracture is compromised.^[3] The introduction of microscopes and newer root canal instruments, has elevated the preparation of the conservative access opening to new heights. Conservation of the cervical dentin remains the single most important aspect for preserve the normal function and longevity of the tooth, once restored.^[4,5]

The possession of knowledge with regard to the anatomical structures and variations remains vital in order to preserve the sound tooth structure from caries removal to root canal enlargement. An important aspect to access cavity preparation is to abstain from gouging cervically, laterally, and into the floor. The accurate location of the orifice followed by cautious canal penetration are vital during access opening. And thus, the use of minimal invasive dentistry, though relying on preservation tooth structure, must be performed with extreme precision.^[6-8] The leading cause of root canal treatment failure remains the loss of excessive tooth while traditional access cavity preparation is found to be the second largest cause contributing to the failure of root canal treatment.^[9] This is where a minimally invasive concept of access cavity preparation comes into play in order to decrease the incidences of failure of a root canal.^[10] Conservative endodontic cavity

preparations has resulted in improved prognosis of root canal treated teeth. This has also been rightfully labelled as an ultraconservative ‘‘endodontic cavity.’’^[11,12] Though contracted endodontic cavities (CEC) have shown to improve fracture resistance as compared to traditional endodontic cavities, it poses a risk of possibility with regard to inefficient canal instrumentation and the occurrence of procedural errors.^[12] However, a recent study has revealed that CECs in maxillary molars did not appear to impact instrumentation efficacy.^[13]

CONCLUSION

The coming of age has seen minimally invasive endodontics strongly attempt and succeed to overtake the long followed conventional approach.^[14] A strong advocate to the minimally invasive technique is the ‘truss access’, which has at its core the preservation of healthy tooth structure. Moreover, this concept paves way for conservative post-operative restorations as it provides a considerable amount of healthy hard tissue post root canal treatment, as compared to the amount that a root canal treatment performed with a conventional access cavity preparation could offer, thus even avoiding the need for conventionally places crowns.

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