Case Report

Management of Wide Canal With Roll Cone Technique - A Case Report

Aditya Gupta[1], Dakshita Joy Sinha[2], Rashmeet[3], Sukhinder Kaur Soni[4]

Post Graduate Student[1]
Dept. of Conservative Dentistry & Endodontics
Inderprastha Dental College & Hospital
Sahibabad 201010

Professor & Head[2]
Dept. of Conservative Dentistry & Endodontics
Inderprastha Dental College & Hospital
Sahibabad 201010

Post Graduate Student[3]
Dept. of Conservative Dentistry & Endodontics
Inderprastha Dental College & Hospita,
Sahibabad 201010

Post Graduate Student[4]
Dept. of Conservative Dentistry & Endodontics
Inderprastha Dental College & Hospital
Sahibabad 201010

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Abstract

Maxillary anterior are the most trauma prone teeth in the oral cavity. Endodontic therapy for the maxillary anterior teeth is generally done due to trauma. Challenge arises when the root formation of the tooth is not complete and it under goes trauma, which causes tooth to become non vital. When the toot becomes non vital and the root formation is not complete, it becomes a case of open apex. Open apex generally posses the challenge of endodontic therapy due to absence of an apical stop against which the operator can pack the obturating and material without pushing it beyond the apex in the peri radicular tissue.

Thus different techniques are used to over tis challenge, one of the technique is discussed in this case report.

Keywords: Blunderbuss canal, maxillary anterior, Open apex, Roll cone technique, Trauma

Introduction

The most important factor in endodontics is proper debridement of the canal, to obturate it effectively and three-dimensionally as possible.

This leads to a proper apical seal with a "fluid-tight" obturation which prevents bacterial ingress and ensures a favorable outcome.

However, having a proper apical seal becomes difficult in patients with open apices. Obturation becomes a challenge due to the large open apex, diverging walls, thin dentinal walls that are susceptible to fracture and associated frequent periapical lesion.

The most common teeth with open apex are maxillary anterior. This is due to its position in the jaw which is more prone to trauma and less due to caries.

There are two types of open apex:

1. Non-blunderbuss type.
2. Blunderbuss type.

Non-blunderbuss type: Walls are parallel or slightly convergent as the canal exits the root. Apex can be broad (cylinder shape) or slightly tapered (convergent).

Blunderbuss type: Walls of the canal are divergent, and flaring, especially in a buccolingual direction. Mostly, the apex is funnel-shaped, wider than the coronal aspect.

Absence of sufficient root development to provide a conical taper to the canal and is also referred to as a blunderbuss canal. **(Franklein S. Weine 1972)**

"Blunderbuss" is referred to as the 18th century weapon which has a short and wide barrel. It derives its origin from the Dutch word "DONDER-BUS" which means "thunder gun."

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Causes of open apices are as follows:

1. Incomplete development of the tooth due to necrosis of pulp due to caries or trauma before root formation is completed.
2. Extensive apical resorption due to orthodontic treatment, periapical pathosis, or trauma.
3. Root-end resection in periapical surgeries.
4. Over instrumentation

Treatment options:-

1. Blunt-end or rolled cone (customized cone obturation).
2. Induction of root-end formation (Apexogenesis).
3. Root-end closure (Apexification).
4. Revascularization

Case Report

A 21-year-old male patient reported to the Department of Conservative Dentistry and Endodontics, with a complaint of fractured and discolored upper left central incisors compromising the esthetics and function. The patient gave a history of trauma around 8-9 years back. Patient got his right maxillary central incisor root canal treated followed by post and core and crown rehabilitation.

Present history revealed no pain or swelling. Medical history was non-contributory Clinical examination showed Ellis Class IV fracture and discoloration in the maxillary leftcentral incisor impairing the esthetics and function of the patient.

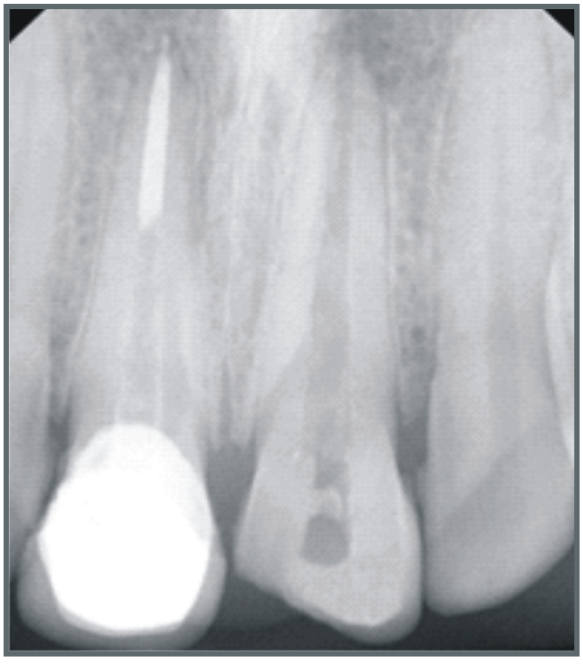

Figure 1 – Pre Operative Intraoral Periapical Radiograph

Radiographic examination revealed an immature tooth with a wide apex in the case of the maxillary left central incisor (21) and radiolucency around the periapical region involving the maxillary left central (21).

Electric pulp testing (Digitest, Parkell, INC., Edgwood, NewYork) was also done for both the teeth and they gave no response to it. Considering the clinical situation above, it was decided to do a root canal treatment of 21 followed by non-vital bleaching and composite build-up.Access cavity preparation was done under rubber dam isolation of both incisors.

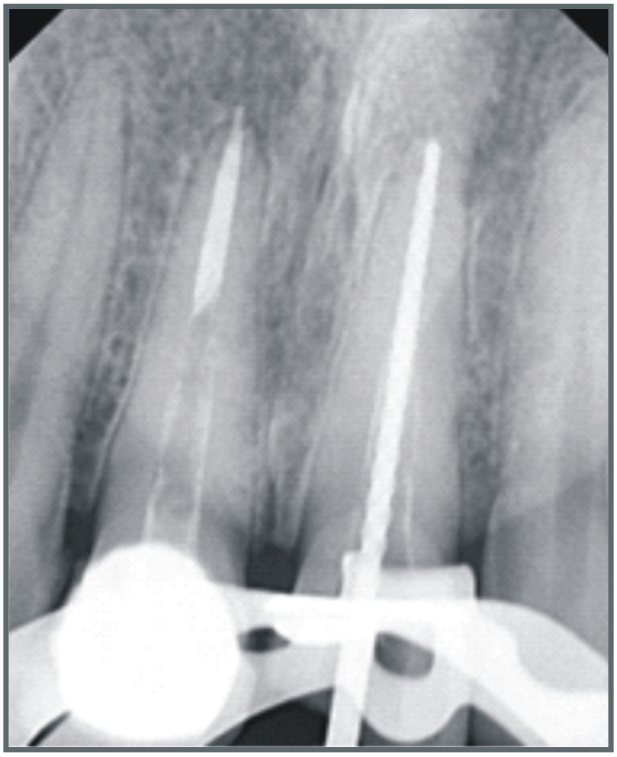

Figure 2 – Iopa Showing Working Length with ISO # 110 K File

Working length was confirmed radiographically with a size #110 K file in a central incisor (Dentsply Maillefer, Switzerland). Cleaning and shaping were done by circumferential filing with #100 K file in the central incisor (21).Copious irrigation was done with saline and 2.5% sodium hypochlorite (Qualikems fine chem Pvt. Ltd., Vadodara, India) between each filing.

17% Ethylenediaminetetraacetic acid (Avue prep, Dental Avenue pvt. ltd, Thane, India) was used during preparation. After cleaning and shaping, the root canalwas dried with paper points (Meta Biomed co. ltd., Korea)and filled with calcium hydroxide (Avue Cal, Dental avenue Pvt. ltd. , Thane, India). The access cavity

wassealed with temporary restoration (Tempfill-G, Shivam Industries, Jammu, India)After 1 week, under rubber dam isolation the calcium hydroxide was removed by repeated rinsingwith saline and sodium hypochlorite. The canal was dried with sterile paperpoints.

As patient could not afford the expenses of mineral trioxide aggregate (MTA) and due to time constraints revascularization was not possible. So, another cheaper option was chosen for the obturation of the central incisor.The tooth was obturated with roll cone technique by making a customized master cone using #80(2%) and #30(2%) gutta-percha cones.Adseal sealer was used for obturation. PFM crown weas given to the patient.

Figure 3 – Making Custom master cone by rolling 2 different size gutta percha on the heated glass slab and by heated metal spatula

Figure 4 – Master Cone IOPA by Custom Gutta percha

Figure 5 - Obturation with lateral condensation and Composite restoration done

Discussion:

The outcome of the above treatment results in closure of the apex by the formation of the apical barrier which prevents extrusion of gutta-percha material from the apex. It also prevents passage of bacteria and toxins into the peri-radicular region from the root canal.

Roll cone technique:

Accomplished by heating two, or more, large GP cones and rolling the mass between two glass slabs until an appropriate size is obtained. A spatula may also be used to shape the cone.

Another method to customize cone:

The technique involves selection of a master cone and fitting that cone 2 to 4 mm short of the prepared length with frictional resistance.

The cone is grasped with locking cotton pliers or a hemostat so that it can be placed into the root canal in the same spatial relationship each time.

The tip of the GP cone is removed and the resultant new tip is softened in chloroform, eucalyptol, or halothane for 1 or 2 seconds, depending on the clinical requirements.

Only the outer superficial portion of the cone is softened.

The central core of the cone should remain semirigid. The cone is then placed back into the canal to the working length.

The process can be repeated until an adequate impression of the canal is obtained at the prepared length. A radiograph is exposed to verify proper fit and position. Other treatment options available for these type of cases could be:-

- Calcium hydroxide apexification
- Biodentine apexification
- MTA (Mineral trioxide aggregate) apexification
- Pulp revascularization

Conclusion:

Apart from all the advantages of roll cone technique, proper canal disinfection, achieving a fluid-tight seal, limiting the apical barrier and obturation within the canal, plays an important role in a successful endodontic treatment.

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