

Inverted Cone Guttapercha Obturation in Open Apex: A Case Report and Review

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Abstract

Case Report

Despite high success rate of endodontic treatment between 85 and 95%, failures can occur due to persistent infection. Lack of hermetic seal can lead to recontamination of the root canal system. The diameter of non vital open apex tooth complexes the adaptation of obturating materials to desired working length. The clinical case of reinfected non vital open apex was disinfected and obturated with inverted cone guttapercha technique. Signs of periapical tissue healing and bone formation were observed after periodic follow up.

Keywords: Open apex, Inverted cone, Guttapercha, Apexification.

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INTRODUCTION

Treating a non vital open apex cases is a challenge to clinician due to difficulty in mechanical preparation, canal disinfection and lack of tapered root canal [1].

The width of canal limits conventional mechanical preparation and fit of tapered guttapercha points. An attempt to create apical taper in open apex cases will make thin fragile dentinal wall at cervical area eventually leading to fracture of tooth.

Over the years different treatment modalities were applied in open apex cases like custom made guttapercha, apexification, reverse cone guttapercha, thermoplastisized obturation, surgical retrograde filling, creation of immediate apical barrier by biomimetic materials and revascularization [2-5].

Irrespective of different treatment modalities factors that influence treatment outcome are diameter of open apex, thickness of root dentin, disinfection, shape of root canal, periapical tissue response to obturating material and duration of treatment. After the canal disinfection in open apex cases techniques which take less time and form immediate apical barrier have replaced time consuming calcium hydroxide apexification and surgical management.

This case report demonstrates inverted cone gutta-percha technique in a re-infected non vital open apex case.

CASE REPORT

A 30 year old male patient reported to our hospital and presented pain and swelling in relation to left maxillary central incisor, who was free from any general health problems. Patient had undergone root canal therapy 2 years back. Painful extraoral swelling was noted over the maxillary anterior teeth area and pain on percussion was elicited. Radiographic examination revealed a large periapical radiolucency and lack of hermetic seal. Diagnosis and need of retreatment was explained to the patient. Guttapercha was retrieved from root canal and working length was estimated. The root canal was prepared using manual endodontic files considering the width of canal and open apex. Irrigation was done with 0.5% of sodium hypochlorite to avoid any complications at each change of instrument. Follow of patient was done for elimination of pain and swelling with idoform based calcium hydroxide intracanal medication. Considering the open apex it was decided to use inverted cone guttapercha for tug back. After taking serial radiographs with increasing number of guttapercha, no#80 guttapercha reverse end was snugly fitting into root canal at desired working length. Obturation was completed with cold lateral condensation technique. 2years Periodic follow up was done for signs of periapical tissue healing and bone formation. Tooth was then considered for post core and crown.



Fig-1: Initial radiograph



Fig-4: Postobturation radiograph

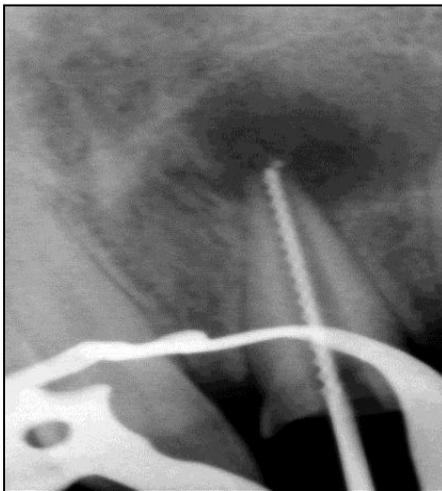


Fig-2: Working length determination



Fig-5: 2 Years follow up

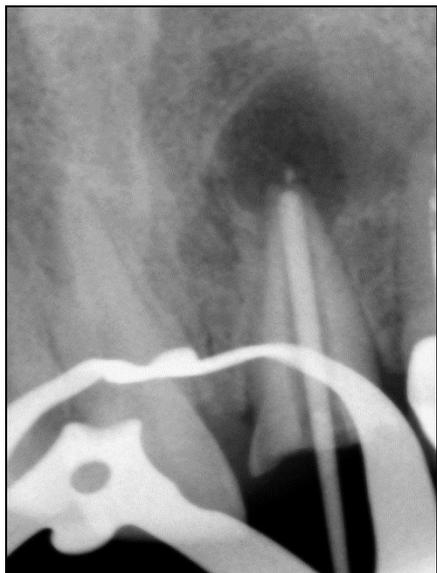


Fig-3: Radiograph showing inverted master gutta-percha cone positioned in the canal

DISCUSSION

Several techniques to fill the large tubular canals have been tried one of which being tailor made gutta percha in which a tailor made guttapercha is prepared of size and shape of the canal [6]. Guttapercha can be customized to the shape of the canal but it may result in apical extrusion and traumatize periapical tissues without apical barrier. During instrumentation and compaction it may lead to fracture due to thin fragile dentinal walls [7].

Apexification is defined as the process of creating an environment within the canal and periapical tissues after pulp death that allows a calcified barrier to form across the open apex of an immature root (Pitt Ford 2002).

Different materials have been used successfully, but the most favoured is a paste of $\text{Ca}(\text{OH})_2$. It appears that the high pH of calcium hydroxide is an important factor in its ability to induce hard tissue formation. Refilling every 3–6 months is

indicated if there is radiographic evidence of resorption of the paste or signs & symptoms of reinfection or pathosis occur at any time during the periodic recall. An average length of time for apical barrier formation ranges from 5 to 20 months [2].

Use of Ca(OH)₂ for apexification procedures has several shortcomings such as prolonged treatment time spanning over several months and dentine exposed to Ca(OH)₂ for an extended period (6 months to 1 year) results in reduced flexural strength and lower fracture resistance [8].

With increase of apical diameter the risk of apical extrusion is more and also thermoplasticized GP may shrink after setting/cooling [9, 10].

Root resection and retrograde cavity preparation may further widen apical diameter making it more fragile and short root length. The outcome of surgical treatment depends on choice of retrograde filling materials which come in direct contact of periapical tissue [11].

Orthograde filling of biomimetic materials create immediate apical barrier even in presence of moisture, blood. They show satisfactory sealing ability with high success rates [12]. Shortcomings of these material are very long setting time and difficult manipulation [13].

Regenerative endodontic procedures are potential alternative to creation of apical barrier by intracanal obturating materials. Root canal space with free of contamination along with revascularization can regenerate vitality and apical growth leading to root end closure [14].

Revascularization procedures can be implemented in any age ranging from 9 to 18 years. Tooth consisting of apical diameter of ≥ 1 mm showed high success in regenerative endodontics [15].

In the above case report inverted cone guttapercha technique was used to seal the canal. Inverted cone technique was considered in this case due to average apical diameter, thick radicular dentin, immediate obturation after canal disinfection and also due to less chance of overobturation. Diameter of Inverted cone at apex can provide seal at apical third of root canal with more of gutta-percha and less of sealer [3].

CONCLUSION

Non vital Tooth with open apex consisting of average diameter, tapering canal can be considered for inverted cone gutta-percha technique obturation.

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