

Non-surgical retrieval of gutta percha including an extruded one using a barbed broach - a case report

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Abstract

Gutta percha (GP) extrusion beyond root apex can occur during an endodontic retreatment. An extruded GP fragment may have the potential to act as a foreign body and initiate or sustain a periapical lesion by affecting the healing. Therefore its retrieval either by surgical or non-surgical means would be deemed necessary. This case report highlights for the first time a novel and seldom reported technique of using a barbed broach to retrieve GP fragments including an extruded one non-surgically and mechanically through the access opening. Barbed broaches, when handled skillfully, would be effective in engaging and retrieving GP, particularly an extruded fragment and they can be employed for such a purpose when other non-surgical methods of GP retrieval are found ineffective or inapplicable.

Keywords: Barbed broaches, endodontic retreatment gutta percha retrieval.

Introduction

The endodontic retreatment is indicated when there is an inadequate root canal filling and coronal dental tissue needs bleaching. Retreatment requires the removal of previous root canal filling material. Gutta percha (GP) being the most widely used root canal filling material, many techniques have been described for its removal from the canal^{1,2}. One complication which may arise during its removal is the extrusion of a gutta percha fragment beyond the root canal confines. Such a fragment, depending on various factors like its size, composition, previous contamination, type of canal sealer etc, has the potential to act as a foreign body or to initiate or sustain a periapical lesion by affecting healing^{3,4,5}. Therefore retrieval of an extruded gutta percha would be deemed necessary.

An extruded gutta percha fragment could be retrieved either nonsurgically, through the access opening or by surgical means^{6,7,8}. However, the nonsurgical retrieval would be a difficult task, as the fragment may not be easily accessible or may get lodged in the periapex. Nevertheless, nonsurgical retrieval should be given a priority over the invasive and traumatic surgical means. Nonsurgical retrieval could be in the form of a thermal, mechanical, chemical methods or a combination of two or more of these methods^{1,2}.

Barbed broaches are short handled instruments used primarily for vital pulp extirpation. They are also used to loosen debris in necrotic canals or to remove paper points, cotton pellets and other foreign materials from the root canal^{1,2,9}. Although broaches are fragile instruments, they are also suggested for the retrieval of GP from the root canal¹⁰. However, no cases are reported in the endodontic literature about using the barbed broaches in the retrieval of GP, particularly extruded ones. This case report illustrates a novel and seldom reported technique of using a barbed broach to nonsurgically retrieve gutta percha fragments including an extruded one and averting the possibility of an apical surgery.

Case Report

A 16-year old male patient was reported seeking treatment of discolored upper left central incisor (21). He gave a history of root canal treatment in tooth 21, carried out three years back, following a traumatic injury to it. Clinical examination revealed that tooth 21 was asymptomatic and intact except for the dark grayish discoloration of its crown portion. The access opening was found sealed with glass ionomer restoration. The periapical radiographic examination showed a well confined but poorly compacted gutta percha obturation in tooth 21 with a periapical radiolucency and an

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inverted mesiodens between the roots of teeth 11 and 21 (Fig 1).

Going by the clinical findings, patient was recommended to undergo nonvital bleaching in tooth 21 as a part of tooth discoloration management. However, due to poor obturation, patient was suggested to undergo endodontic retreatment before bleaching in tooth 21. The endodontic retreatment in tooth 21 was initiated under rubber dam isolation by removing the access opening restoration followed by gutta percha removal using Hedstrom-files (MANI, Inc. Japan) and a chemical solvent Xylene (Merck specialties private limited, India). Working length determination followed by root canal cleaning, shaping and disinfection was carried out. However, in the obturation visit, master cone radiograph revealed residual gutta percha fragments lying in the root canal with one of them extruding into the periapical radiolucency (Fig 2). Therefore a decision was made to retrieve the gutta percha fragments, including the extruded one, mechanically through the access opening by using Hedstrom-files. However, the initial attempts were unsuccessful as the fragments could not be engaged by the Hedstrom-files. Further, due to the position of the extruded fragment, it was deemed not applicable to use other methods of nonsurgical gutta percha retrieval. Therefore a novel approach of using barbed broaches (Micro-Mega, France) to retrieve the gutta percha fragments was attempted. A medium sized (M, green colored) broach, which did not bind in the canal, was inserted gently to the working length and rotated in a clockwise direction to engage the fragments and was taken out. After few attempts, this act of broaching succeeded in retrieving the fragment lying in the canal but not the extruded one. Hence, further attempts were made by introducing a fine sized (F, blue colored) broach to the working length but failed to engage the extruded gutta percha fragment. However, the broaching carried out by inserting and rotating a new fine sized broach slightly beyond working length was successful in engaging and retrieving the extruded fragment also (Fig 3 and 4). The complete retrieval of the gutta percha fragments was radiographically confirmed (Fig 5). Following this, the canal was thoroughly irrigated and obturated with gutta percha points (Dentsply Maillefer, Switzerland) and AH plus root canal sealer (Dentsply Maillefer, Switzerland) using lateral compaction technique. The access opening was sealed using Zinc oxide eugenol cement (Deepak enterprises, India) (Figure 6) and the patient was suggested for rest

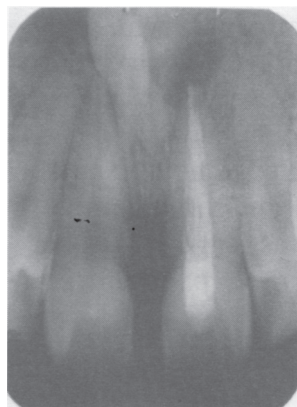


Figure 1: Pre-retreatment radiographic view of tooth 21 showed poorly compacted gutta percha obturation and mesiodens between the roots of teeth 11 and 21.

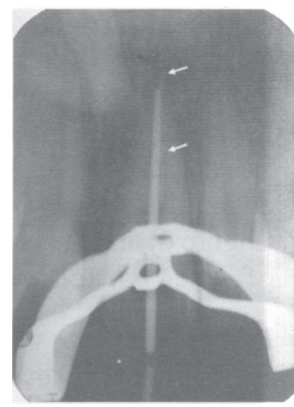


Figure 2: Retreatment master cone radiograph of tooth 21 showed gutta percha fragments lying in the root canal with one of them extruding from the root apex (white arrows)

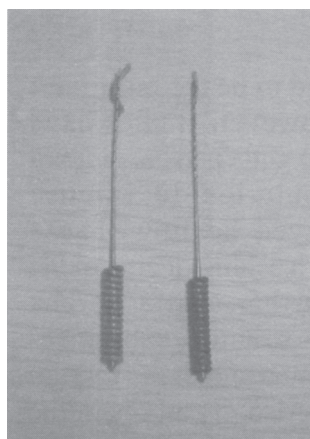


Figure 3: Gutta percha fragments, including the extruded one, retrieved from the canal using Medium (green) and Fine (blue) sized broaches.

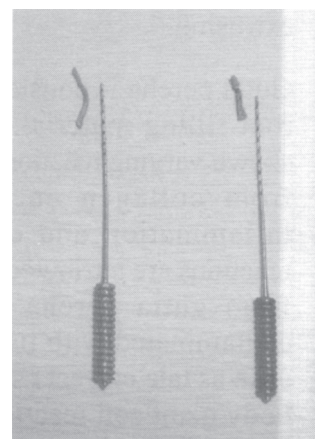


Figure 4: Retrieved gutta percha fragment and the barbed broaches used for the retrieval.



Figure 5: Post-retrieval radiographic view of tooth 21 showing the root canal.



Figure 6: Post-retreatment obturation radiograph of tooth 21.

of the bleaching related procedures.

Discussion

In this patient, although the endodontically treated tooth 21 was asymptomatic, the root canal filling was poorly compacted and it was associated with periapical radiolucency. Therefore from bleaching point of view, endodontic retreatment was initiated to form a barrier against damage by oxidizing bleaching agents to the periapical tissues and better the overall prognosis¹. But the attempt to remove gutta percha led to its extrusion.

Gutta percha is considered to be the most inert root filling material. However, studies have shown varying reactions to gutta percha, ranging from collagen encapsulation to intense inflammation and delayed healing. These reactions are attributed to leaching of zinc oxide from gutta percha. Further, gutta percha contaminated with tissue irritating substances such as talc can act as hapten and cause foreign body giant cell reaction. Also, it can retain the intracanal microorganism and support the formation of extraradicular biofilms which are resistant to phagocytes, and is capable of inducing periradicular inflammation or necrosis of the periodontal ligament. However, in a given clinical situation, response of the periradicular tissues to the gutta percha depends on the complex interaction between the properties of gutta percha (that is, cytotoxicity, antigenity and quantity), its contamination, type of root canal sealer and the host's immune defenses (innate and adapted)^{3,4,5}.

In this patient, retrieval of the extruded gutta percha was important due to the presence of periapical radiolucency and lack of healing and to avert any possibility of a situation necessitating an apical surgery. Since the extrusion was noticed in the obturation visit, it was decided to attempt the gutta percha retrieval nonsurgically through the access opening, which although carried a risk of completely lodging the gutta percha into the periapical radiolucency.

Various methods such as thermal method using heated instrument, mechanical method employing various hand and rotary instruments and chemical method using gutta percha dissolving solvents like xylene have been suggested for nonsurgical retrieval of gutta

percha. Heated instrument method is considered to be the safest but alone it is not always effective. Chemical method is most commonly practiced but there is a toxic side of it too, mechanical method is associated with risk of instrument separation, unnecessary removal of dentin etc. So a combination of two or more of the above methods may be preferred^{1,2,6}.

However, in this patient, mechanical method of using Hedstrom files was found ineffective and considering the position of the extruded gutta percha fragment, other methods were found inapplicable². Therefore a novel approach of using a barbed broach to retrieve the gutta percha fragments was made. Barbed broaches are manufactured from tapered, round, soft iron wire by cutting sharp, coronally angulated barbs into the surface and are available in different colors and sizes ranging from triple extra-fine (XXXF) to extra-coarse (XC). Broaches are intended to remove vital pulp from the root canals, however, their use has declined since the advent of Nickel-Titanium rotary shaping instruments, but broaching may be useful for removing materials like cotton pellet and paper point from the canals. Broach should never be forced into a canal beyond the length where it first begins to bind as it carries the risk of mishaps like breakage of the barbs or the shaft itself inside the canal when gets engaged in the dentin and removed back forcefully. A broken barbed broach embedded in the canal wall is seldom retrieved^{1,2,9}. Notwithstanding the above shortcomings, barbed broaches due to the presence of sharp barbs would have better GP engaging ability than other mechanical means such as Hedstrom files. Therefore the broaching technique, when skillfully handled, would be effective and useful in retrieving gutta percha fragments, especially extruded ones when regular mechanical methods fail or other nonsurgical GP retrieval methods are found inapplicable.

Conclusion

The novel approach of using a barbed broach would be effective in retrieving GP, particularly an extruded fragment. Broaching technique for GP retrieval can be used when other non-surgical methods of GP retrieval are found ineffective or inapplicable.

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