CASE REPORT

Use of Negative Apical Pressure Technique for Removal of Apically Extruded Gutta-percha Fragment – A Case Report

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ABSTRACT

Use of Negative Apical Pressure Technique for Removal of Apically Extruded Gutta-percha Fragment – A Case Report

The aim of this case report was to present using negative apical pressure technique for removal of apically extruded gutta-percha during retreatment procedures. A 22 year-old female patient was referred to the clinic with severe pain, swelling, and tenderness to percussion and palpation in the tooth of #26. Periapical radiograph showed previous root canal treatment of tooth #26 with incomplete root canal fillings. During retreatment procedures gutta-percha apically extruded from mesial root canal. The patient was recalled after one day. At the second session, it was observed that the swelling was increased. One of the tips for calcium hydroxide paste application was adjusted to suction of dental unit. Tip was placed into the canal as deep as possible. After a few attempts, apically extruded gutta-percha was removed and the patient was recalled after one day. At one day from the fragment removal, the swelling was decreased. Calcium hydroxide paste was placed into the canals for one week. At the fourth session, the patient was asymptomatic and the treatment was completed at this session.

KEYWORDS

Gutta-percha, Negative apical pressure, Retreatment

ÖZ

Apikalden Taşmış Gutaperka Parçasının Çıkarılması İçin Negatif Apikal Basınç Tekniğinin Kullanımı – Bir Olgu Sunumu

Bu vaka raporunun amacı kanal yenileme işlemleri sırasında apikalden taşmış gutaperka parçasının çıkarılması için negatif apikal basınç tekniği kullanımının sunulmasıdır. 22 yaşında bir kadın hasta #26 numaralı dişinde şiddetli ağrı, şişlik, ve perküsyon ve palpasyona hassasiyet sebebiyle kliniğimize başvurdu. Periapikal radyograf #26 numaralı dişinde kök kanal dolumu yetersiz olan önceden yapılmış kanal tedavisi olduğunu gösterdi. Kanal yenileme işlemleri sırasında, gutaperka mezial kök kanalının apikalinden taştı. Hasta bir gün sonra tekrar çağrıldı. İkinci seansta, şişliğin arttığı gözlendi. Kalsiyum hidroksit patını uygulamak için kullanılan uçlarından biri dental ünitin aspiratörüne adapte edildi. Uç kanalda mümkün olduğunca derine yerleştirildi. Birkaç denemeden sonra, apikalden taşmış gutaperka çıkarıldı ve hasta bir gün sonra tekrar çağrıldı. Parçanın çıkarılmasından bir gün sonra, şişlik azaldı. Kanallara bir hafta süreyle kalsiyum hidroksit yerleştirildi. Dördüncü seansta, hasta asemptomatikti ve tedavi bu seansta tamamlandı.

ANAHTAR KELİMELER

Gutaperka, Negatif apikal basınç, Kanal yenileme

Endodontic therapy is a conservative treatment, and it has high success rate.[1] Endodontic failure can be caused by procedural errors such as root perforation, ledge formation, separated instruments, missed canals, as well as anatomical difficulties such as apical ramification, isthmuses, and other morphologic irregularities.[2,3] When initial root canal therapy fails, clinicians have some options such as nonsurgical endodontic retreatment, apical surgery, and intentional replantation. Nonsurgical endodontic retreatment is primarily recommended before employing invasive procedures, such as apical surgery or intentional replantation.[4] The removal of as much filling material as possible from an inadequately cleaned and/or obturated root canal system is main aim of retreatment procedures since remaining necrotic tissues or bacteria might be responsible for periapical inflammation and post-treatment disease.[5, 6]

Removing filling materials makes root canal retreatment more difficult and it is a more troublesome process than the initial root canal treatment. During retreatment, extrusion of root canal filling materials, necrotic pulpal tissues, irrigation solutions, and microorganisms into the periradicular tissues can lead to postoperative pain and inflammation.[7] Because the gutta-percha is already recognized as a foreign body and root canal filling materials and root canal systems of the most of the teeth requiring retreatment are infected, extrusion of the root filling material affects the outcome of retreatment.[8]

The aim of this case report was to present using negative apical pressure technique for removal of extruded gutta-percha during retreatment procedures.

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CASE REPORT

A 22 year-old female patient was referred to the Department of Endodontics with severe pain, swelling, and tenderness to percussion and palpation in the left maxillary tooth of #26. The patient's medical history was not contributory. Preoperative periapical radiograph revealed previous root canal treatment of tooth #26 with incomplete root canal fillings on both mesial and distal roots (Figure 1a). The patient was advised for retreatment of the tooth #26.

After patient's approval of the treatment, the restoration of the tooth was removed and a straight access cavity preparation was achieved without anaesthesia. The rubber-dam was applied and coronal third of the root canals were prepared by using R25 instrument (Reciproc; VDW, Munich, Germany) with brushing motion. Each root canal was irrigated with 2 mL of 1% NaOCl. A #15 K-file (Dentsply Maillefer, Ballaigues, Switzerland) was fixed to the apex locator (Propex Pixi; Dentsply Maillefer, Ballaigues, Switzerland), and moved forward in the root canals. The palatal and distal root canals were prepared with R25 instrument at the working length and palatal root canal was further prepared with R50 instrument and distal root canal was prepared with R40 instrument. Each root canal was irrigated with 2 mL of 1% NaOCl between each instrument changes and pecking motions. The working length of mesiobuccal-1 root canal was not easily established. Thus, the root canal was irrigated with 2 mL of 1% NaOCl again, R25 was used for preparation of middle third of the root. Then, it is tried determination of length of root canal using #15 K-file, but it could be determined after trying 4-5 times. When the file reached to working length, the patient reported pain. After that, missed mesiobuccal-2 was found and working length was determined. R25 and R40 instruments were used for preparation of mesibuccal-1 canal, and R25 was used for preparation of mesiobuccal-2 canal. A confirmation radiography was taken and it revealed that all previous root canal material was removed but there was a gutta-percha extrusion from mesial root canal apex (Figure 1b). The access cavity was sealed with using temporary restorative material (Cavit, 3M ESPE, Seefeld, Germany) and medicament was not placed into the canals. Patient was informed about this complication. The patient was prescribed non-steroidal anti-inflammatory drug to manage pain and swelling. The patient was recalled after one day.

At the second session, it was observed that the swelling was increased. The access cavity was re-entered under rubber dam isolation. It was decided that apical negative pressure technique might be beneficial for removal of extruded gutta-percha. For this aim, one of the tips for calcium hydroxide paste application was adjusted to unit's suction system (Figure 2). Tip was placed into the canal as deep as possible. After a few attempts, extruded gutta-percha was removed and confirmation radiography was taken (Figure 1c). The access cavity was sealed temporarily and the patient was recalled after one day.

At the third session, the swelling was decreased. After removing temporary restorative material, the canals were irrigated with 1% NaOCl and 5% EDTA, and dried with paper points. Calcium hydroxide paste was placed into the canals and the access cavity was sealed temporarily. The patient was recalled after one week.

At the fourth session, the patient was asymptomatic. Root canals were obturated using cold lateral compaction technique with gutta-percha and sealer (2Seal; VDW GmbH, München, Germany) (Figure 1d). The access cavity was filled with composite resin (Filtek™ Z250 Universal Restorative System; 3M ESPE). Because the patient moved out another city, the patient was called after one year from the treatment. The tooth was still asymptomatic and the patient is pleased with her tooth.

Figure 1.

(a) Preoperative periapical radiograph. (b) The radiography which revealed that all previous root canal material was removed but there was a gutta-percha extrusion from mesial root canal apex. (c) The radiography which revealed that extruded gutta-percha was removed. (d) Postperative periapical radiograph.

Figure 2.

The tip for calcium hydroxide paste application was adjusted to unit's suction system and it used for removal of extruded gutta-percha fragment.

DISCUSSION

Primary aim of endodontic retreatment procedure is complete removal of root canal filling material. Necrotic tissues and bacterial remnants in the root canal can lead to endodontic treatment failures.[9] The host immune response against extruded materials or foreign body reactions to root canal filling materials such as gutta-percha may provoke postoperative pain and swelling during the retreatment.[10] In this case, during the retreatment procedures, a gutta-percha fragment extruded from mesial root canal apex. After one day, it was observed that the swelling was increased. Foreign body reaction to extruded gutta-percha or inhibition of drenage of exuda can explain this situation.

Root canal treatment has high success rates ranging from 86-92%.[11] But, root canal treatment may conclude failure because of many reasons. It is reported that the quality of root canal filling is the most important factor for success of root canal treatment.[12] In another study, it is reported that the voids in the apical and middle thirds of the root canal filling had a significantly more effect on failure of root canal treatment than voids in a more coronal level.[13] Another important reason of failure of root canal treatment is untreated canals. Hoen and Pink[14] examined 1100 failed endodontically treated teeth and they noted that 42% of these cases had missed canals. Voids in root canal filling or an untreated canal often give rise to the multiplication of bacteria and this concludes with persistent pain, inflammation and an apical lesion.[15] In this case report, patient was referred to our department with severe pain, swelling, and tenderness to percussion and palpation. There were incomplete root canal fillings on both mesial and distal roots and there was also an untreated mesiobuccal-2 canal. These are most probable reasons of the failure of initial root canal treatment of this case.

In this case report, it has been described an alternative method for removal of extruded gutta-percha during retreatment procedures. Hand files, rotary systems or reciprocal systems are options for removal of extruded gutta-percha.[9] Working with manual or mechanical instrumentation techniques can result pushing root canal filling material more apically and can also damage periapical tissues mechanically.[9] Removal of extruded gutta-percha is one of the most challenging stages, even when the canal was overfilled during initial root canal treatment.[9] The fact that extruded gutta-percha is completely beyond the apex makes the situation more difficult. Using negative apical pressure technique, without more mechanic damage to periapical tissues or risk of push the gutta-percha more apically, provided removal of the extruded gutta-percha.

CONCLUSION

This case report described using negative apical pressure technique as an alternative method for removal extruded gutta-percha during retreatment procedures. This case report demonstrated the importance of complete removal of previous root canal filling material without extrusion. However, it is not always to avoid extrusion. In such cases, using negative apical pressure technique provides a safe technique for removal of extruded gutta-percha.

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