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CASE REPORT

Removal of Periapical Gutta-Percha: Case Series

Atul Jain¹, Annu Mayank², Rachana Bahuguna³, Rohit Sharma⁴, Madhurima Sharma⁵, Gopi Kumhar⁶

¹Professor & Head, ²PG Student, ³Professor, ⁴Professor, ⁵Professor, ⁶Assistant professor

[1,2,3,4,5]Department of Conservative Dentistry & Endodontics, Teerthanker Mahaveer Dental College & Research Centre (TMDC&RC), Moradabad, ⁶Department of Anaesthesiology, MGM Medical College, Kishanganj, Bihar

ABSTRACT:

The extrusion of Gutta-percha (GP) periapically can occur during endodontic treatment. An overextended GP fragment acts as a foreign object and can affect the healing ability by initiating formation of periapical lesion. Therefore its retrieval either by surgical or non-surgical means becomes important. Various options for removing non-surgically are with k-files, H-files, heat carrier tips, GP solvents, combination of paper point with solvents and heat transfer devices. This article discusses 4 cases, in which the periapically detached GP was retrieved using combination of K-file, H-file and Xylene.

Key words: Gutta Percha, Retreatment, Peri-radicular lesion.

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Corresponding Author: Dr. Annu Mayank, PG Student, Department of Conservative Dentistry & Endodontics, Teerthanker Mahaveer Dental College & Research Centre (TMDC & RC), Moradabad, Uttar Pradesh

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INTRODUCTION:

Long term prognosis of an endodontic procedure, apart from other factors is based on three-dimensional obturation. Many a times, clinicians encounter problems during obturation in the form of extrusion of GP and sealers. These if located outside the tooth in the periapical area can cause inflammation and impede the healing after obturation.^[1] The inflammatory response at the root apices of non-vital teeth, initiates periapical lesion, leading to formation of cyst or granuloma. Therefore in order to prevent formation of such periapical pathology, retrieval of an apically displaced GP should be carried out.^[2]

An overextended GP fragment can be removed either by non-surgical or surgical means. Non-surgical removal may be difficult since the separated fragment may not be easily approachable or may get lodged within the peri-apex.^[3] Nevertheless, non-invasive method should be preferred over the invasive ones for better outcome. Towards this end, various technique utilising hand files, rotary, ultrasonics, heat, paper point with solvents and their combination have been advised. Retreatment kit has been found to be quite

effective for removing GP. Use of GP solvent can facilitate the process. This case report discusses four different cases, where GP had gone beyond apex and was retrieved non-surgically.

CASE REPORT 1:

An 18 year old female patient, reported to the OPD with the chief complaint of broken tooth with food lodgement in respect to upper right back teeth region since last 2 years. Intra-oral examination revealed carious 16. The tooth was non-tender to percussion and palpation and gave no response to thermal and electric pulp test. Intra-oral radiograph showed deep occlusal caries extending to pulp chamber, disruption of lamina dura and presence of periapical pathology. Diagnosis of asymptomatic irreversible pulpitis with asymptomatic apical periodontitis was made, for which patient was advised to undergo endodontic treatment. The tooth was anaesthetised and coronal access cavity was prepared using Endo Access bur and Endo Z bur. The canal orifices were located with the help of DG16 endodontic explorer and 4 orifices were identified. A

size 15#k file was inserted to check the canal patency. Working length was determined using electronic apex locator and verified by the periapical radiograph. After debriding the necrotic pulp tissue, temporary restoration was given.

On the second appointment, temporary filling was removed and biomechanical preparation was carried out. During obturation with GP and Zinc Oxide Eugenol sealer using lateral condensation technique, radiograph revealed detached GP fragment, extending 1mm beyond the apex. Orthograde Non-surgical removal of this filling material was decided to avoid post-operative pain and inflammation of the periapical

region. 25# H-file dipped in 0.5ml xylene was introduced 1mm beyond the foramen, to engage the extruded GP segment using clockwise rotational motion. Then the file was gently and firmly withdrawn from peri-apical area in a single stroke without any lateral movement. This procedure was repeated 3-4 times, until all the extended obturation material was removed. Calcium hydroxide dressing was then placed and the patient was recalled after a week, when obturation of this tooth was carried out. At 6 months follow up, patient was found to be clinically asymptomatic with peri-apical healing radiographically.



Figure 1: Preoperative 16



Figure 2: Working Length



Figure 3: Detached GP fragment



Fig 4: Apically displaced GP



Fig 5: GP retrieval



Fig 6: Post obturation



Fig 7: 6 month follow up

CASE REPORT 2:

A 21 year old female patient, reported to our department with the chief complaint of pain in upper front tooth region since last 2 months. Pain was dull, intermittent in nature that aggravated on mild touch and gradually subsided on its own. Medical history was non-relevant. Extra-orally, no abnormality was noticed. Intra-oral examination revealed mild discoloured and fractured 11. The tooth was tender to percussion and palpation with delayed response to electric pulp test. IOPA revealed exposed pulp with periapical pathology in relation to 11. Asymptomatic irreversible pulpitis with symptomatic apical periodontitis was established in 11. Patient was advised endodontic treatment followed by Fiber Post and Crown placement.

Tooth was anaesthetised and the access cavity was prepared with no.2 bur under the air water spray. Working length was determined and the canals were prepared with rotary instruments. On the next appointment, obturation was performed with Protaper GP and AH Plus Sealer, temporary restoration was done. Patient was recalled after a week for Fiber Post placement.

During post space preparation with peeso reamer, GP and Sealer extruded accidentally 1-2mm beyond the apex, which was verified radiographically. This apically dislodged GP was attempted to be retrieved with combination of chemical and mechanical methods. 2-3 drops of Xylene was injected into the canal and 40 to 80 sized H-files were placed 1mm beyond the foramen sequentially. Each file was rotated and pulled out from the periapical region in a single motion.

The process was repeated several times to ensure retrieval. Radiographic verification was done. Pro-Root MTA mixed with saline was placed with an MTA applicator tip into the canal, as an apical barrier to prevent further leakage or transportation of filling materials and the canal was closed after placing moist cotton pellet.

On the next appointment sectional obturation was performed using GP points and AH26 sealer. Then fiber post was luted and core build-up was done with Fluorocore Composite. Crown preparation was carried out and metal ceramic crown was fabricated. At 6 months follow up, patient was found to be clinically asymptomatic with absence of periapical lesion radiographically.



Fig 1, 2: Preoperative 11



Fig3: Working length



Fig4: Obturation



Fig5, 6: Extension of GP and sealer apically



Fig 7: Retreatment



Fig8:MTA placement



Fig 9: Sectional obturation



Fig10: Luting



Fig11: Crown placement



Fig12: post operative view with space prepared



Fig 13: 6 months follow up

CASE REPORT 3:

A 36 year old male patient reported to the department with the chief complaint of pain in upper front teeth region, since last 6 months. History of present illness revealed mild, intermittent pain in teeth that had undergone root canal treatment, 6 months back. On examination and test, diagnosis of previously treated tooth with symptomatic apical periodontitis in 21 was established. Patient was advised, non-surgical endodontic retreatment followed by placement of post and core with crown. After rubber dam isolation, permanent restoration with entire obturating material was removed using round bur and 25# H-file. The access cavity was modified and the working length was determined with 15# k-file. Radiograph revealed the presence of two separate canals, mesial and distal, with two different orifices. Biomechanical preparation was done with copious irrigation using 5.25% sodium hypochlorite followed by 17% EDTA and saline.

Obturation was carried out using lateral condensation technique. The tooth was temporised and the patient was recalled after a week for post and core fabrication. During GP retrieval for post space preparation with Peeso reamer, it was radiographically found that GP had gone beyond the foramen. For its retrieval, 0.5ml of xylene was placed into the canal orifice using H-file in a successively increasing number starting from size #30 till #80 to engage the overextended GP. Each file was rotated in a semi-circular motion until it engaged the tip of extruded GP and pulled out with a single straight movement. Removal of GP was confirmed radiographically. The canal was rinsed with saline and dried with paper point. The luting of the post and the core build up was done with Fluorocore Composite. At 6 months follow up, patient was found to be clinically asymptomatic and radiographically no periapical pathology was evident.



Fig 1: pre-op 21



Fig 2: Obturation removal



Fig 3: Access opening



Fig 4: Working length



Fig 5: Master cone



Fig 6: Obturation



Fig 7: Extrusion of GP



Fig 8: Engaged GP



Fig 9: Retrieved fragment



Fig 10: Radiograph verification



Fig 11,12: Post space preparation and insertion





Fig 13: Luting of fiber post



Fig 14: Six months follow up

CASE REPORT 4:

A 31 year old male patient, reported to the department, with the complaint of pain and food lodgement in upper right back teeth region since last 15 days. Pain was sudden, severe and continuous in nature, aggravated by mild touch and relieved on taking medication. Symptomatic irreversible pulpitis with symptomatic apical periodontitis was diagnosed in 14. Patient was advised endodontic treatment of 14.

The access cavity preparation was performed under local anaesthesia. Two orifices were located and the working length was determined radiographically. Cleaning and shaping was done with Protaper Gold

using 5.25% NaOCl, 17% EDTA and saline. Single cone obturation was carried out with GP and AH Plus sealer. Post-operative radiograph revealed presence of separated GP fragment 1mm beyond the foramen. Retrieval of GP was attempted by mechanical means. H-files were used for removal. For periapically lodged GP fragment, a No. 30 size H-file was used to engage with a single rotational movement and pulled out from the canal. The confirmation of its removal was done radiographically. Re-obturation was performed on the same appointment. At 6 months follow up, patient was found clinically asymptomatic with no periapical pathology.



Fig 1: Preoperative



Fig 2: Working length

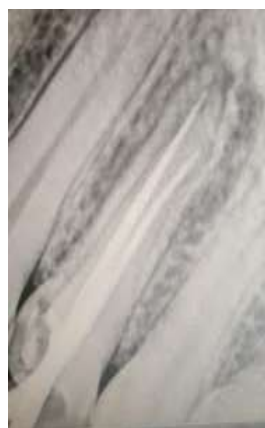


Fig 3: Mastercone

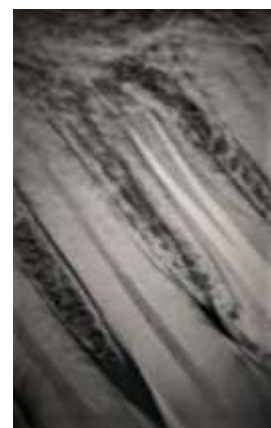


Fig 4: Obturation



Fig 5: GP retrieval



Fig 6: Re-obturation



Fig 7: 6 months follow up

DISCUSSION:

GP is the most widely used obturating material, owing to its unique ability to change in volume on temperature variation.^[4] It can also be condensed within the lateral and accessory canals when used with proper obturation technique.^[4] For the same reasons, it has the potential of causing overfilling or overextension in absence of an apical stop or due to excessive pressure application.^[5] This GP beyond the confines of root may cause severe irritation in the peri-apical region, resulting in inflammation and pain.^[6] After a certain time period, if the orthograde retrieval is not initiated then it leads formation of a periradicular lesion.^[5]

Sjogren et al reported that the intensity of inflammatory response is based on the size of the extruded portion of GP particle.^[7] Large GP mass evoke minimal inflammatory response due to being well encapsulated around the peri-apex compared with the smaller ones, which produce intense localized response. Funibunda et al, Gallas et al and Blanas et al in separate studies have reported neurological complications due to extruded GP.^[8, 9, 10] Kafas et al found that the presence of any material beyond the apex whether separated file, sealer, cement or GP, acts as a foreign element which initiates reaction in connective tissue.^[11] They proposed that host immune defence mechanism tends to re-absorb such foreign particles or encapsulate it with a fibrous capsule around the peri-apex to stimulate the healing process without any associated sign and symptoms. In our reported cases, as soon as the extruded GP was detected, its orthograde retrieval was attempted to avoid any complications later.

Removal of GP depends on the Operator's skill and knowledge about the complexity of the canal. Previously employed methods using only mechanical means, work frequently but care is needed, as there is a possibility of displacing GP further apically.^[6] There is also possibility of instrument fracture.^[2] Retrieval completely by chemical means is not recommended due to toxicity of the agents used.^[12] Xylene has been widely used in retrieval cases because it dissolves GP slowly, is easily available and produces less cytotoxicity when compared with other solvents.^[13] Therefore, we used the combination of chemical and mechanical approach. In our technique, Xylene was placed near the extruded GP with H- file, which decreased the resistance of GP towards removal by softening and enhancing its dissolution. Additionally, the application of xylene facilitates insertion of H-File, reduces force application, resulting in shorter working time thus making the procedure safer. Ramos et al found that compared to other solvents, Xylene has greater dissolution potential.^[14] Mushtaq et al also found Xylene to be most effective in GP removal.^[13] When combined with appropriately sized H files, it facilitates the passive insertion of the rotary instrument.^[1] Metzger and Ben-Amar utilizing Xylene and H-File were successful in removing peri-apically

extruded GP in 17 cases.^[15] Kesim et al found H files to be similar in effectiveness as Mtwo and better than Protaper and Reciproc rotary files in removal of overextended filling material.^[16]

The extruded GP fragment in the periapical area may remain stable, well tolerated by the surrounding tissues, without impeding the healing process.^[8] In most such cases, there are higher chances of infiltration of neutrophilic leukocytes and macrophages inducing transient acute response followed by chronic phase, leading to loss of lamina dura and damage to the periodontium.^[17] In such situations, orthograde retrieval is a better alternative, being safe, non-invasive with higher success rate.^[17,18] If non-surgical attempt fails, then surgical approach should be adopted.^[18]

CONCLUSION:

Retrieval of periapically extruded GP should be attempted orthograde using a combination of chemical and mechanical means. If this attempt fails then surgical intervention should be carried out.

REFERENCES:

1. Ingle JI, Luebke RG, Zidell JD, Walton RE, Taintor JF. Obturation of the radicular space. Endodontics. 3RDed. Philadelphia: Lea & Febiger. 1985:223-307.
2. Cohen S, Burns RC. Pathways of the pulp, 3rd ed. St.louis: CV Mosbys. 1984:291-2.
3. Ingle JI, Bakland LF, Baumgartner JC. Ingle's Endodontics. 6thed. Hamilton, Ontario: BC Decker Inc; 2008.
4. Goodman A, Schilder H, Aldrich W. The thermo-mechanical properties of gutta-percha. The history and molecular chemistry of gutta-percha. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1974; 37(6): 954-61.
5. Ruddle CJ. Endodontic canal preparation: breakthrough cleaning and shaping strategies. Dentistry Today. 1941; 3(2): 44-49.
6. Santoro V, Lozito P, Donno AD, Grassi FR, Introna F. Extrusion of Endodontic Filling Materials: Medico-Legal Aspects: Two Cases. Open Dent J. 2009; 3: 68-73.
7. Sjogren U, Sundquist G, Nair PNR. Tissue reaction to gutta-percha particles of various sizes when implanted subcutaneously in guinea pigs. Eur J Oral Sci. 1995; 103: 313-21.
8. Fanibunda K, Whitworth J, Steele J. The management of thermomechanically compacted guttapercha extrusion in the inferior dental canal. Br Dent J. 1998; 184: 330-2.
9. Gallas-Torreiras MM, Reboiras-López MD, García-García A, Gándara-Rey J. Parestesia del nervio dentario inferior provocada por un tratamiento endodóncico. Med Oral 2003; 8: 299-30.
10. Blanas N, Kienle F, Sandor G. Inferior alveolar nerve injury caused by thermoplastic guttapercha overextension. J Can Dent Assoc. 2004; 70: 384-7.
11. Kafas P, Upile T, Angouridakis N, Stavrianos C, Dabarakis N, Jerjes W. Dysaesthesia in the mental nerve distribution triggered by a foreign body: A case report. Cases J. 2009; 2: 169.
12. Chutich MJ, Kaminski EJ, Miller DA, Lautenschlager EP. Risk assessment of the toxicity of solvents of gutta-

- percha used in endodontic retreatment. *J Endodon.* 1998; 24: 213-216.
13. Mushtaq M, Farooq R, Ibrahim M, Khan FY. Dissolving efficacy of different organic solvents on gutta-percha and resilon root canal obturating materials at different immersion time intervals. *J Conserv Dent.* 2012; 15(2): 141-145.
 14. Ramos TI, Câmara AC, Aguiar CM. Evaluation of Capacity of Essential Oils in Dissolving ProTaper Universal Gutta-Percha points. *Acta Stomatol Croat.* 2016; 50(2): 128-133.
 15. Metzger Z, Ben-Amar A. Removal of overextended gutta-percha root canal fillings in endodontic failure cases. *J Endod.* 1995; 21(4): 287-88.
 16. Kesim B, Üstün Y, Aslan T, Topçuoğlu H S, Şahin S, Uluşan. Efficacy of manual and mechanical instrumentation techniques for removal of overextended root canal filling material. *Niger J Clin Pract.* 2017; 20: 761-6.
 17. Seltzer S, Soltano FFW, Sinai I, Goldenberg A, Bender IB. Biologic aspects of endodontics Part III. Periapical tissue reaction reactions to root canal instrumentation. *J Endod* 2004; 30: 491-99.
 18. Ramić B, Stojanac I, Premovic M, Drobac M, Petrovic L. Orthograde Endodontic Retreatment of Teeth with Individual Cast Posts. *Srp Arh Celok Lek.* 2012; 140(7-8): 495-499.