

## Perforation Management of Bifurcation in the Treatment of Root Canal

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### Abstract

Perforation in the bifurcation area of the tooth is an undesirable condition during the treatment of the dental canal that can interfere with outcomes and prognosis. This case report aims to inform how good management can address perforation cases in the bifurcation. A female patient, age thirty four years, tooth #26 presented with a cavity on the occlusal surface extending to the mesial surface, from the pulp to the bifurcation area. Foundation, palpation, vitality tests, and mobility were all negative, and there was positive percussion. The radiographic representation of the radiolucent area in the occlusal part extended to the bifurcation area. The diagnosis was pulp necrosis. First, bifurcation perforation management involves cleaning up the remaining caries tissue, cessation of bleeding, clinical condition analysis, radiograph analysis, and administering treatment stages. At the stage of treatment, first root canal therapy and fouling on the bifurcation were carried out. The radiographic result is seen in the radiopaque area of the bifurcation, indicating that the bifurcation area has been closed. Results: At one week, the results were good, with no complaints. Furthermore, there was a full crown restoration of fused metal porcelain with tapered serrated (unmetrical) tapered boosters.

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### Introduction

Endodontic treatment is performed to treat pulp necrosis by cleansing and forming root canals (root canal preparation) and root canal filling. Perforation during root canal treatment may interfere with outcomes and prognosis.<sup>1</sup> Perforation in the bifurcation is usually an unintended complication.<sup>2</sup>

Perforation occurring in the bifurcation area has a negative impact on the prognosis of endodontic treatment, since granulation tissue tends to form and may enter the tooth in the perforated portion.<sup>3</sup>

The important factors that contribute to the success of perforation care are good management such as analyzing the case through

the radiograph so that the size and location of the perforation can be detected properly. The diagnosis of bifurcation perforation is largely based on symptoms and radiographic examination. Clinical symptoms that occur are usually bleeding at the base of the pulp chamber and pain when instrumentation is placed into the base of the pulp chamber.<sup>4</sup>

Lack of good management causes the occurrence of many cases of perforation of bifurcation. Good management should be undertaken to determine the stage of the treatment plan, that is, to bump in the bifurcation area first or root canal treatment first prior to the perforation area swab. This case report aims to inform how good bifurcation perforation management should be undertaken to address this complication of endodontic care.

### Method

A thirtyfour years old female patient sought endodontic treatment as she had large painful holes in her teeth. The results of clinical examination of tooth #26, it has messicity on the mesial surface of the mesial, from the pulp to the bifurcation area (Figure 1). Objective examination

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found that Sondasi was negative, percussion was positive, palpation was negative, vitality test with CE result was negative, ion was negative, and mobility test was negative. The radiographic representation (Figure 2) showed the area of the radiolucent part of the occlusal until the bifurcation area. The diagnosis was pulp necrosis. The dental treatment was to treat the tooth and treat the patient with the bifurcation.



**Figure 1.** The Cavity of the Pulp Depth Penetrates the Bifurcation Area.



**Figure 2.** Radiographs Appear to Show Large Bifurcation Perforation Areas.

The patient agreed to have her teeth treated and signed the informed consent for her dental treatment after receiving an explanation of the purpose, treatment procedure, medical risks, and prognosis for this dental treatment, and agreed, if the treatment was successful, to publishing the case for the benefit of the development of science and technology in dental care.

Bifurcation care management needed to be undertaken to treat this case considering that

during this time carried out the revocation action on the case of perforation on bifurcation. The management of the bifurcation perforation treatments performed was as follows: cleansing of the remaining caries tissue, cessation of bleeding, clinical condition analysis, radiograph analysis, administration of stages of the treatment plan.

Cleaning of remaining caries tissue was done using a round bur, followed by bur endo access. Cessation of bleeding was performed by means of sterile potted cotton wetted anesthetic solution, pressed slowly in the bifurcation area.

Analysis of the clinical condition was done by locating the orifice position with a smooth broach to know the position of the orifice against the bifurcation perforation. The radiograph was analyzed to determine the position of the perforation and root canal position. Stages of the treatment plan were based on the analysis of clinical conditions and radiograph analysis results obtained, which showed that the position of the orifice was difficult to reach so it was not possible to do the fouling first done in the root canal treatment until the obturation stage. After the hermetic radiograph obturation (Figure 3), a placement into bifurcation area was performed.

First the dentin conditioner was applied for ten seconds and then washed and dried. GICLC Caps were mounted on the machine to be stirred using a machine (Figure 4), then the capsule was mounted on a special syringe (Figure 5) so that it could be applied to the bifurcation area, and then shined for forty seconds.



**Figure 3.** Obturation Results, in Which the Bifurcation Area Still Looks Open.



**Figure 4.** GIC Capsule Mounted on the Machine for Stirring.



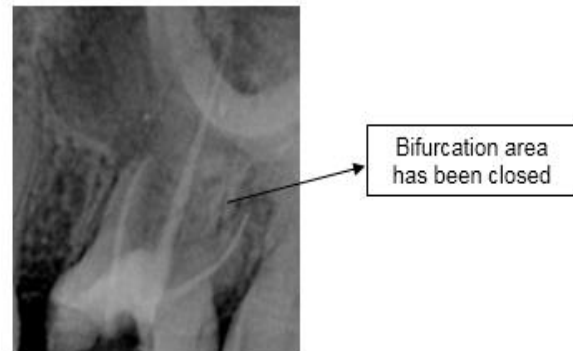
**Figure 5.** GIC Capsule Mounted on a Special Syringe.

### Results

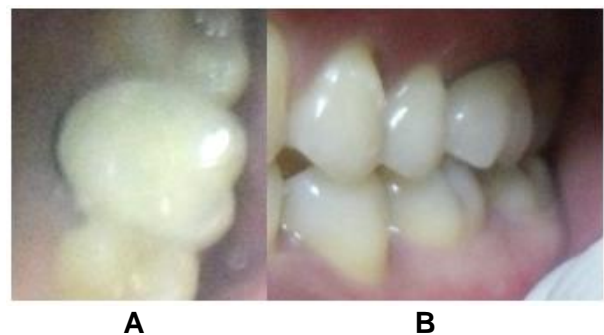
After GIC LC capsule setting, a radiograph was taken to check the condition of the bifurcation area. The radiographic result (Figure 6) shows the radiopaque area of the bifurcation area, indicating that the bifurcation area has been closed.



**Figure 6.** Perforation Closure Results in the Bifurcation Area.



**Figure 7.** Bifurcation Area Has Been Closed.



**Figure 8.** Crown Restoration with Full Crown Fused Metal Porcelain with Tapered Serrated (Unimetric) Tapered Boosters. (A) Restoration Appears to Be Occlusal (B) Restoration Looks Buccal.

At one-week, subjective examination results showed no complaints of pain, no complaints during mastication, and teeth working well. The results of clinical examination showed normal gingiva, and examinations by percussion and palpation were negative. The radiographic results showed the radiopaque area of the bifurcation indicating that the perforated bifurcation had been closed (Figure 7). Therefore, crown restoration with full crown fused metal porcelain with unmetrical adjusted (unmetrical) enzyme was performed (Figure 8).

At nine months post-treatment subjective examination showed no complaints of pain, and teeth were working well especially during mastication. The results of a clinical examination (Figure 9) showed normal gingiva, the fused metal porcelain crown was still good as there was no change in color and there was no traumatic occlusion. The contour, contact area, embrasures and edge density were still good.

The results of objective examination by percussion and palpation were negative. The radiographic results (Figure 10) showed the radiopaque area of the bifurcation, indicating that the bifurcation had completely closed, with normal periodontal ligament and normal periapical tissue.



**Figure 10.** Results of Clinical Examination.



**Figure 10.** Results of Radiographic Examination.

## Discussion

Root canal treatment is indicated when there are clinical symptoms and definite findings on a radiograph showing periapical disease.<sup>5</sup> In this case, perforation of bifurcation results in tooth extraction because it is believed that the tooth can no longer be treated.<sup>6,7</sup> In this case, we found a way of performing bifurcation perforation management so that the teeth can be treated and do not need to be extracted. Bifurcation perforation management can be determined by the stage of treatment to be performed so as to determine the material to be used to close the perforation. Selection of essential ingredients is carried out to cover the perforation area.<sup>7,8</sup>

The ideal material for the treatment of endodontic perforation should be non-absorbable, nontoxic, radiopaque, bacteriostatic or bactericidal, and readily applicable. The material must also seal the micro leak tightly at the perforation location.<sup>9</sup> The material commonly used for perforation treatments is mineral trioxide aggregate (MTA) but this material tends to be expensive.<sup>10</sup> The lack or limitation of MTA is that the length of the timing setting is difficult to use. The material is easier to use in a boxed cavity that is easily accessible.<sup>11</sup> When the MTA material is not available, the dentist should use other materials for the perforation. In this case report, light-cured glass ionomer was an alternative to MTA replacement. The material in the form of a capsule was stirred using a machine and applied with a special tool that is syringed in order to reach the perforated bifurcation area. The advantage of this material is that it is insoluble in mouth fluid, adhesive to tooth structure, and high strength. Light-cured glass ionomers also have low shrinkage properties, low thermal expansion, and the presence of fluorescent releases such as glass ionomer.<sup>12</sup> This is different from MTA, which has a long time setting and requires a competent clinician.<sup>13</sup> Dentists can easily apply light-cured glass ionomers with these capsule preparations. In addition, the closure and resistance to micro leakage are obtained from chemical bonding of materials in enamel and dentin.<sup>14</sup> This light-cured glass ionomer application can be used to restore dental functions previously considered untenable. Light-cured glass ionomers are highly biocompatible for soft and hard tissues. As an added benefit, fluoride releaser is contained in light-cured glass ionomer.<sup>15,16</sup>

Teeth that have been done Particle Size Analyzer will experience physical and aesthetic changes. Therefore, it is necessary to restore so as to protect the remaining hard tissue of the tooth against fracture.<sup>16,17</sup> Therefore, the final restoration was a full crown of fused metal porcelain with tapered serrated (unmetrical) tapered boosters.

## Conclusion

In cases of perforation in bifurcation, the removal of teeth has been the standard therapy. In this case, we found a way to treat perforation in bifurcation by performing management that

includes cleaning of the caries tissue, bleeding cessation, clinical analysis, radiograph analysis, and use of treatment stages, so that the selection of the right material for the case can be determined. Bifurcation perforation management is important to support successful treatment so that teeth with perforation in the bifurcation can still be maintained.

## References

1. Stavileci M, Hoxha V, Görduysus MO, Laperre K, Tatar I, Hoxha R. Effect of Endodontic Instrumentation Technique on Root Canal Geometry. *J Int Dent Med Res* 2017;10(3):952-957.
2. Unal GC, Maden M, Isidan T. Repair of Furcal Iatrogenic Perforation with Mineral Trioxide Aggregate: Two Years Follow-up of Two Cases. *Eur J Dent* 2010;4(4):475-481.
3. Ronise FD, Alcebiades NB, Ricardo SD, Roberta CH. Sealing of Root Perforation with Glass Ionomer Cement: A Case Report. *Stomatos J* 2014;20(1):35-46.
4. Balasubramaniam R, Krishnan A, Jayakumar S. Restoring the Dignity: Case reports of Root Perforation Management. *Int J Appl Dent Sci* 2017;3(3):171-174.
5. McCabe PS, Dummer PMH. Pulp canal Obliteration: An Endodonticdiagnosis and Treatment Challenge. *Int Endodont J* 2012;45(1):177-197.
6. Chhabra A, Dogra A, Garg N, Bhatia R, Sharma S, Thakur S. Clinical and Radiographic Assessment of Periapical Pathology in single Versus Multivisit Root Canal Treatment: An in Vivo Study. *J Conserv Dent*. 2017;20(6):429-433.
7. Silveira CMM, Sanchez-Ayala A, Lagravere MO, Pilatti GL, Gomes OMM. Repair of Furcal Perforation with Mineral Trioxide Aggregate: Long-Term Follow-Up of 2 Cases. *J Canad Dental Assoc*. 2008;74(8):729-733.
8. Macwan C, Deshpande A. Mineral Trioxide Aggregate (MTA) in Dentistry: A Review of Literature. *J Oral Res Rev*. 2014;6(2):71-74.
9. Bansode PV, Pathak SD, Wavdhane MB, Khedgikar S, Gite S. Non-Surgical Repair of a Perforation Defect-A Case Report. *Quest J: J Med Dent Sci Res*. 2017;4(1):32-35.
10. Somayaji K, Shobha KL, Ballal V, Amy NN, Gupta L. Quantification of Lipoteichoic Acid of Gram Positive Bacteria after Irrigation with Sodium Hypochlorite in Root Canal-An in vitro Study. *J Int Dental Med Res* 2017;10(2):233-238.
11. Farea M, Husein A, Pameijer CH. Endodontic Perforation Repair with light-Cured Glass Ionomer. *Int Dent-Afr* 2011;1(1):84-92.
12. Putranto AW, Kamizar, Usman M. The Effectiveness of using Sonic and Manual Dynamic Irrigation Techniques to Remove the Smear Layer on the Apical Third of a Root Canal Wall. *J Int Dental Med Res* 2017;10(Special Issue):744-750.
13. Bollu IP, Hari A, Thumu J, Velagula LD, Bolla N, Varri S, Kasaraneni S, Naili SVM. Comparative Evaluation of Microleakage Between Nano-Ionomer, Giomer and Resin Modified Glass Ionomer Cement in Class V Cavities- CLSM Study. *J Clin Diagn Res*. 2016;10(5):ZC66-ZC70.
14. Bolla N, Kavuri SR, Tanniru HI, Vemuri S, Shenoy A. Comparative Evaluation of Antimicrobial Efficacy of Odontopaste, Chlorhexidine and Propolis as Root Canal Medicaments Against *Enterococcus faecalis* and *Candida albicans*. *J Int Dental Med Res*. 2012;5(1):14-25.
15. Ayu NPAD, Bachtiar BM, Akbar SMS. Quantitative Real-Time PCR of cps Type 1, 2 and 5 of *Enterococcus faecalis* and *Candida albicans* Isolated from Infected Root Canal of Subject Requiring Endodontic Treatment. *J Int Dental Med Res* 2016;9(3):157-163.
16. Carlos RB, Nainan MT, Pradhan S, Sharma R, Benjamin S, Rose R. Restoration of Endodontically Treated Molars Using All Ceramic Endocrowns. *Case Rep Dent*. 2013;2013(1):1-5.
17. Pini NP, Aguiar FHB, Lima DANL, Lovadino JR, Terada RSS, Pascotto RC. Advances in Dental Veneers: Materials, Applications, and Techniques. *Clin Cosmet Investig Dent*. 2012;4(1):9-16.