Received: 28 November 2020 | Revised: 17 February 2021 | Accepted: 21 February 2021

DOI: 10.1002/ccr3.4017

CASE REPORT

Clinical Case Reports Open Access WILEY

Management of primary molars with irreversible pulpitis employing tampon pulpotomy: Report of three cases with 34-month mean follow-up

Saeed Asgary[1] | **Alireza Sarraf Shirazi**[2] | **Sedigheh Sabbagh**[3]

[1]Iranian Center for Endodontic Research, Research Institute of Dental Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

[2]Pediatric Dentistry Department, School of Dentistry, Mashhad University of Medical Sciences, Mashhad, Iran

[3]Dental Materials Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

Correspondence
Sedigheh Sabbagh, Dental Materials Research Center, Mashhad University of Medical Sciences, Mashhad, Iran.
Email: sedigheh.sabbagh@gmail.com

Abstract

This study suggests that tampon-based coronal pulpotomy using a calcium silicate–based biomaterial can be a reliable approach for the treatment of vital primary molars with irreversible pulpitis.

KEYWORDS

calcium-enriched mixture cement, deciduous, irreversible pulpitis, pulpotomy, radiographic success, tooth

1 | INTRODUCTION

Pulpectomy is the reference treatment for vital primary molars with irreversible pulpitis. The presented cases suggest that tampon-based coronal pulpotomy using a calcium silicate–based biomaterial can be a reliable approach for the treatment of such teeth; however, further clinical trials are needed to confirm the technique.

Over the past decades, dental caries has unfailingly been the most common chronic infectious disease of childhood and adults. If remained untreated, it can potentially compromise dental pulp tissue.[1] When the dental pulp of primary teeth is irreversibly inflamed, the first treatment choice is pulpectomy, owing to the well-recognized importance of primary tooth retention for child oral/general health.[1,2] Although a pulpless tooth can remain functional in the oral cavity, modern pediatric endodontics encourages regenerative approaches in primary teeth.[3,4]

The introduction of calcium silicate–based (CS-B) biomaterials such as mineral trioxide aggregate (MTA), along with further understanding of pulp biology and inflammatory processes, has revolutionized treatment modalities for management of irreversible pulpitis in mature permanent teeth.[5,6] A growing body of evidence has revealed successful implementation of minimally invasive endodontics, that is, vital pulp therapies (VPTs) for management of permanent teeth with irreversible pulpitis even when associated with apical periodontitis.[5,7] Due to the traditional notion of poorer healing capacity of primary dental pulp, such a paradigm shift has not been seen in pediatric dentistry.[3,8] Recent research revealed similar vascular/immune responses of primary and permanent dental pulps to caries; therefore, indicating that their healing potential might be identical.[8,9] Bearing this in mind, a reevaluation of traditional approaches for treatment of inflamed primary pulp seems justified.[3,8,9]

Calcium-enriched mixture (CEM) cement, the patent issued by the United States Patent and Trademark Office (an endodontic filling material, USA, 7 942 961, May 17, 2011), is a hydraulic and tooth-colored CS-B biomaterial with similar clinical applications to MTA. Despite different chemical composition, CEM has sealability, dentine-inductive effect, and biocompatibility comparable to those of MTA.[6] Additionally, CEM antibacterial activity is similar to calcium hydroxide (CH)[6]; the cement is inexpensive with good handling characteristics and short setting time.[6,10] CEM cement is now a promising biomaterial in VPT of mature permanent teeth with irreversible pulpitis.[7,11-13] Recently, a clinical study reported favorable outcome of CEM pulpotomy in primary molars with irreversible pulpitis when hemostasis could be obtained.[14] Interestingly, successful outcomes were also achieved after this biomaterial was tamponed on pulpal wound of mature permanent molars with uncontrollable bleeding following coronal pulp amputation.[15] The technique has been coined as tampon pulpotomy (TP).

The purpose of this case series is to present the outcomes of TP using CEM cement, a novel regenerative-based treatment, in three primary molars with irreversible pulpitis and uncontrolled pulpal bleeding.

2 | CASE PRESENTATION

2.1 | Case 1

A healthy 4-year-old girl was referred to the clinic of pediatric dentistry department of Mashhad Dental School for management of her carious symptom-free primary mandibular left first molar. Despite the child's inadequate cooperation during her previous dental treatment and the family's financial constraints, her parent insisted on saving the tooth. Visual clinical examination revealed that the tooth had occlusal and deep proximal caries with normal surrounding soft tissue. Percussion/palpation tests resulted in no sensitivity and the tooth had no mobility. A preoperative periapical radiograph confirmed a deep proximal carious lesion involving the pulp and normal corresponding periodontium (Figure 1A). Considering dental history and clinical and radiographic examinations, the initial diagnosis was asymptomatic pulpitis with normal periodontal status. The concluding pulp diagnosis was deferred until direct inspection of the tissue/bleeding. Possible treatment options for the tooth were vital pulpotomy or pulpectomy treatment, depending on the pulp condition. Taking into consideration the benefits of short-duration dental procedures for such a patient, an alternative, that is, TP using CEM cement was also offered in case the vital hyperemic pulp was encountered. The parents were briefed about possible risks/discomforts and benefits of each treatment option. They chose TP, as it seemed a simpler/quicker solution to save the child's tooth.

Topical anesthesia and then inferior alveolar nerve block (IANB) using 2% lidocaine with 1/80 000 epinephrine (Darou Pakhsh) was administered. Under rubber dam isolation, caries removal was carried out from the periphery to the center using a round carbide bur mounted on a low-speed handpiece until painful pulp exposure with abnormal, deep-red-colored bleeding was encountered. As periodontal ligament (PDL) injections were unsuccessful to provide adequate anesthesia, intrapulpal (IP) injection was carefully given, depositing a small amount (about 2-3 drops) of anesthetic solution in the pulp chamber above canal orifices. The chamber was then unroofed and coronal pulp was amputated using a round-end fissure bur in a high-speed handpiece with adequate water spray and light pressure until canal orifices were reached. Next, the access cavity was flushed with sterile normal saline solution. Saline-wetted cotton pellets were placed for about 5 minutes over amputation sites applying moderate pressure to control pulpal hemorrhage.

After discarding the pellets, blood oozing was present. CEM cement with creamy consistency was prepared according to the manufacturer's instructions (BioniqueDent, Tehran, Iran). Using a plastic instrument, an adequate bulk of the biomaterial was inserted on the pulp stumps. Following immediate/gentle adaptation using a dry cotton pellet, a minimum 2 mm thick layer of CEM was present. After initial setting time, the biomaterial was covered with resin-modified glass ionomer (RMGI; GC Corporation) and the tooth was permanently restored with stainless steel crown (SSC). An immediate postoperative periapical radiograph was also taken

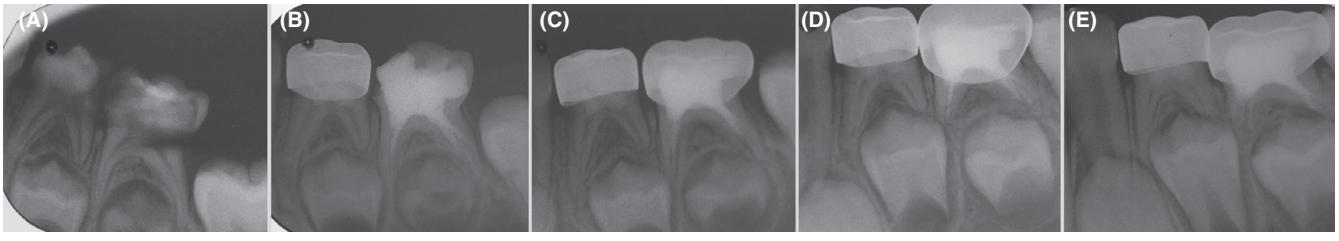

FIGURE 1 A, Preoperative periapical x-ray of primary mandibular left first molar showing deep distal proximal caries involving the pulp. B, Immediate post-treatment radiograph. C, Radiograph four months after tampon pulpotomy with CEM cement. Formation of hard tissue barriers is evident at canal orifices. D, Radiographs at 20-month and E, 33-mo recall examinations. Note the presence of pulp canal obliteration and calcified barriers in both root canals

(Figure 1B). Follow-up examinations were scheduled to be done at 1, 3, and 6 months postoperatively and, thereafter, every 6 months.

During 33-month recall period, the treated molar showed no adverse clinical or radiographic signs or symptoms indicative of unsuccessful outcomes (Figure 1C-E). Main radiographic findings were calcified bridge formation, first evident on four-month radiograph, and pulp canal obliteration (PCO) seen thereafter (Figure 1C-E).

2.2 | Case 2

A healthy 4-year-old boy was referred to the same clinic complaining about persistent toothache in right posterior mandibular region beginning a day later. According to his parents, the boy was given Ibuprofen for pain control and had poor cooperation at his first dental visit the evening before. Clinical examination revealed extensive occlusal caries of both primary right mandibular molars with normal surrounding gum tissue. There was no tooth mobility, and percussion test was unreliable. The preoperative radiograph demonstrated deep caries of the primary right second molar within the pulp's vicinity. This was considered the primary cause of child's discomfort. The tooth's PDL was normal (Figure 2A). Based on these findings, the diagnosis of symptomatic pulpitis with normal periodontium was made. Two conventional treatment options offered were pulpectomy and tooth extraction followed by space maintenance. Considering the benefits of short dental visits for such a pediatric patient, and the parents' strong preference for nonextraction treatment, TP using CEM cement was suggested as a viable alternative to pulpectomy if upon treatment the pulp was hyperemic. Possible risks and benefits of each treatment were completely explained to the parents and they selected TP if indicated.

Topical anesthesia application was followed by IANB administration. Under rubber dam isolation, caries removal was performed from the periphery. Due to the patient intolerance to low-speed handpiece vibration and sound, the central caries was cautiously excavated by a sharp spoon excavator until painful pulp exposure occurred. The pulpal bleeding at the exposure site was judged to be abnormal with deep red color. To alleviate hyperalgesia, IP injection was carefully given. The same procedure as described in case 1 was then employed. Following the hemorrhage control protocol, blood oozing was still present. Similarly, CEM biomaterial was gently placed to cover the pulpal floor. Due to time limitation, a saline-moistened cotton pellet was placed over the biomaterial and the tooth was temporized with reinforced zinc oxide eugenol cement (Zonalin, Kemdent, Swindon, UK). Nine days later, the pain had disappeared and percussion test was normal. RMGI was placed over set CEM and SSC was cemented in place. Recall schedule was planned as in case 1.

The treated tooth was followed for 35 months postoperatively. On all examinations, the tooth was clinically functional and free of pathologic clinical or radiographic findings (Figure 2B-E). Hard tissue barriers across canal orifices and PCO were two main radiographic findings at the final radiographic evaluation (Figure 2E).

2.3 | Case 3

A healthy 5-year-old girl with a chief complaint of intermittent toothache of lower left posterior sextant of about 2-month duration attended the clinic. The child had no history of previous dental treatments. Visual clinical examination revealed extensive occlusal caries of primary mandibular left second molar, suspected as the source of dental pain, with normal corresponding soft tissue. The tooth had normal mobility; however, it was slightly sensitive on percussion. On periapical radiographic view, a deep occlusal caries reaching the pulp and normal periodontium was evident (Figure 3A). The initial diagnosis of symptomatic pulpitis with normal periodontal status was made. Pulpectomy and tooth extraction followed by space maintenance were two standard treatments suggested. Considering the advantages of a short first dental treatment, TP using CEM cement was also offered as an alternative option, provided that the pulp was vital and hyperemic. After explaining possible discomforts and benefits, the parent consented to TP, where indicated, in order to save the tooth.

After obtaining profound anesthesia with IANB, rubber dam was applied and almost all caries was removed until pulp exposure with profuse, deep-red-colored bleeding was

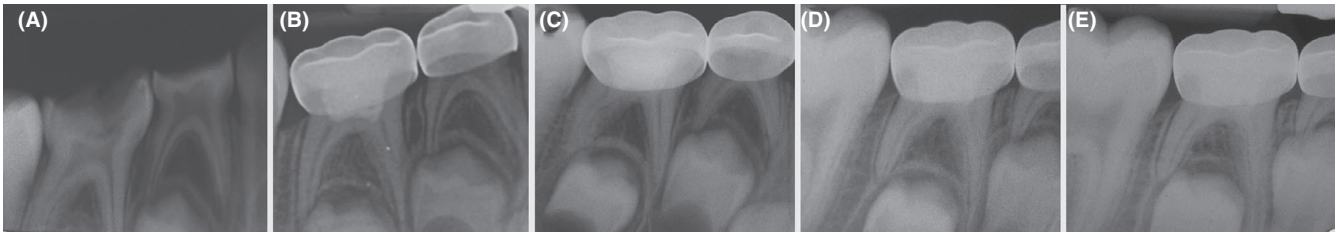

FIGURE 2 A, Preoperative periapical x-ray of primary mandibular right second molar. B, Three-month follow-up radiograph showing hard tissue barrier over distal root pulp. C, Twelve-month, D, 24-month, and E, 35-month x-rays demonstrating pulp canal obliteration. Also note the presence of hard tissue barriers across canal orifices evident at 24-month and 35-month radiographs

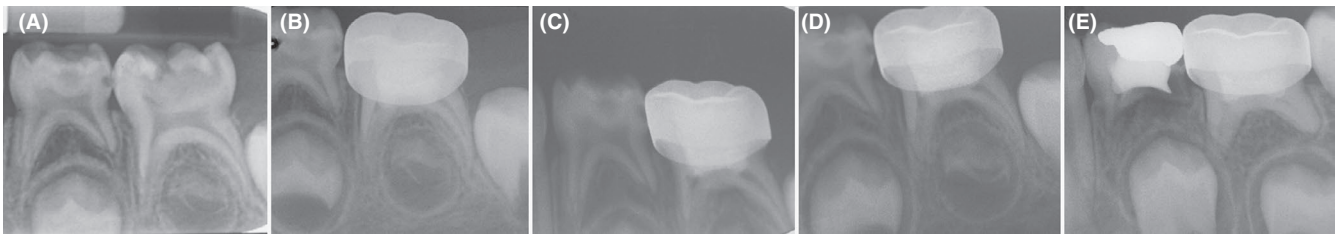

FIGURE 3 A, Preoperative periapical radiograph of primary mandibular left second molar demonstrating deep occlusal caries reaching the pulp. B, Immediate postoperative radiograph. C, One-month follow-up radiograph revealing small internal root resorptions (IRRs). D, Three-month x-ray control. Note arrested IRRs and evidence of pulp canal obliteration (PCO). E, 33-month periapical radiograph showing repaired IRRs and PCO. Treatment failure in conventionally pulp-treated primary first molar is also evident

encountered. The rest of the procedure was completed similar to case 1. However, after removing the saline-wetted pellets used to control hemorrhage, the pulpal bleeding recommenced, which was stopped after complete adaptation of CEM cement. Finally, a periapical postoperative radiograph was taken and the same recall schedule was arranged (Figure 3B).

The second molar was followed up for 33 months. At one-month recall, percussion sensitivity had resolved, and clinically the tooth remained functional and sign/symptom-free thereafter. Evidence of internal root resorptions (IRRs) at the cervical third of both roots existed on one-month follow-up radiograph (Figure 3C). This was later followed by PCO (Figure 3D and 3E).

3 | DISCUSSION

This study is the first report showing the successful outcomes of CEM tampon pulpotomy treatment of cariously exposed primary molars—with the diagnosis of irreversible pulpitis—associated with unsuccessful pulpal hemorrhage control. During TP using CEM cement, light pressure applied by gentle adaptation of the cement (as a tampon) mechanically stops bleeding from cut pulpal vessels. In addition, CH as a by-product of hydration reaction of CEM cement may help reducing pulpal vascular outflow due to its direct effect on microvasculature.[16] A dental pulp with uncontrollable pulpal hemorrhage within 5 minutes after a cervical pulpotomy in the clinical setting has been categorized histologically in the moderate to severe pulpal inflammation group,[17] and the gold standard treatment for these primary teeth has been pulpectomy.[2] However, our outcomes indicated that uncontrollable pulpal hemorrhage is not a reliable indicator for rejecting simple pulpotomy procedure.[18]

Preoperative spontaneous pain is often a marker of extensive pulpal inflammation which contraindicates vital pulpotomy.[19] Absence of pain, however, does not preclude the occurrence of irreversible changes.[1,17] Moreover, experiencing pain during caries removal/upon pulp exposure frequently indicates the presence of hyperemic and inflamed pulp tissue, rather than inadequate pulpal anesthesia, which also indicates that the tooth is not suitable for pulpotomy treatment.[20] Such situation necessitates giving supplemental injection(s) to provide patient comfort. IP and PDL injections, in turn, reduce pulpal blood flow, which may explain marked reduction in the amount of pulpal re-bleeding after the bleeding management protocol in cases 1 and 2. Interestingly, performing IP injection, contrary to a widely held belief, did not adversely influence the treatment outcomes.

Favorable results achieved after TP of primary molars can be attributed to several factors. Infection is often the prime cause of inflammation in the body and eliminating the source of infection can result in tissue healing.[7] Removing (almost) all infected dentine/pulp tissues during cervical pulpotomy procedure allowed the inflamed root pulp a chance to heal.[7,21,22] Additionally, further impairment to the remaining inflamed dental pulp was avoided by cutting the coronal pulp with minimal trauma. This averted nontreatable tissue changes.[23] Surgical removal of pulpal tissue without additional iatrogenic pulp injuries during TP procedure is recommended.[24]

Another factor was the choice of pulp capping material, that is, CEM cement, as the material characteristics directly influence pulp healing process. CEM displays properties favorable for pulp inflammation recovery, including sealing ability, antimicrobial activity, and induction of dentinogenesis.[4] There may, however, be potential consequences of blood incorporation into CEM, as a tampon, on its desired properties. Although the results from recent in vitro studies were inconclusive, no negative effects on the final fate of treated molars occurred that could be attributed to this issue. Last but not least, the prevention of microbial recontamination is a vital factor that can be attained by the biological seal provided by CEM dressing of at least 2 mm in the peripheral margin. This seal was further reinforced by RMGI chamber filling and the final SSC restoration.[2,25]

Theoretically, when employing TP technique, IRR is expected to be the frequent radiographic finding since the inflammation of radicular pulp at time of treatment is a cause for IRR.[26] Nonetheless, early small IRRs were encountered one month after TP with CEM biomaterial in one case (case

3), which later repaired itself by calcified tissue. It has been argued that such an isolated/controlled phenomenon does not negatively affect succedaneous tooth eruption/macroscopic structure.[27] Considering the aim of primary tooth pulpotomy, repaired IRR should not be considered as failure.[26] In the present study, the most common radiographic finding seen in all three treated teeth was PCO. This common post-pulpotomy finding is attributed to the extensive activity of odontoblast-like cells, confirming the vitality of remaining pulp. PCO is generally not considered as an indication of failure.[26] Moreover, formation of hard tissue barrier was seen in two treated cases. The presence of calcified bridge, however, is not a reliable indication of success/failure and cannot definitively be determined radiographically.[28]

Pulpectomy is a specialized and time-consuming procedure with variable reported success rates (70%-90%).[14] Performing such treatment for young children/those presenting with pain to dentists as their first dental visits can be even more challenging. On the other hand, TP with CEM cement is a simpler and quicker treatment, even quicker than conventional formocresol pulpotomy which benefits (young) children with short attention spans/inadequate cooperation.[26] This regenerative technique can be completed in one treatment session with basic dental instruments and inexpensive biocompatible pulp dressing,[7] making it economical treatment choice. TP using CEM cement in a vital and hyperemic primary pulp may be able to save primary teeth with the diagnosis of (symptomatic) irreversible pulpitis that otherwise would be extracted due to high dental expenses/child's inadequate cooperation. Furthermore, considering current COVID-19 pandemic and other future outbreaks, employing this novel treatment in eligible cases has the benefit of shortening the treatment time and therefore can reduce the risk of disease transmission during a dental visit.[29-31]

In conclusion, the present study suggests that tampon-based coronal pulpotomy employing CEM cement, a CS-B biomaterial, can be a reliable approach for the treatment of irreversible pulpitis of vital primary molars. This promising beginning should be followed by further trials with TP using CEM cement as well as other CS-B biomaterials to evaluate its potential indications/possible complications. We also recommend conducting well-designed randomized clinical trials comparing this regenerative technique with the reference treatment, that is, pulpectomy.

ACKNOWLEDGMENTS

The authors thank Dr Laleh Alim Marvasti for her thoughtful English editing of the manuscript. Published with written consent of the patient.

CONFLICT OF INTERESTS

Dr Saeed Asgary is the inventor of CEM cement (Endodontic Filling Material; USA, 7,942,961, 2011 May 17).

AUTHOR CONTRIBUTIONS

SA: designed the study, supervised the research, critically revised the manuscript. ASS: supervised the clinical and follow-up procedures, critically revised the manuscript. SS: performed the clinical procedures and followed the patients, prepared the original draft.

ETHICAL APPROVAL

Approval was obtained from the Ethical Committee of Mashhad University of Medical Sciences (Letter No. 98/456661).

INFORMED CONSENT

Informed consent was obtained from all parents whose children were included in the study.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

ORCID

Sedigheh Sabbagh https://orcid.org/0000-0002-1075-9227

REFERENCES

1. Gonzalez-Lara A, Ruiz-Rodriguez MS, Pierdant-Perez M, et al. Zinc oxide-eugenol pulpotomy in primary teeth: A 24-month follow-up. *J Clin Pediatr Dent*. 2016;40(2):107-112.
2. American Academy of Pediatric Dentistry. Pulp therapy for primary and immature permanent teeth. *Pediatr Dent*. 2017;38(6):280-288.
3. Waterhouse PJ. "New age" pulp therapy: personal thoughts on a hot debate. *J Endod*. 2008;34(7 suppl):S47-50.
4. Mehrdad L, Malekafzali B, Shekarchi F, et al. Histological and CBCT evaluation of a pulpotomised primary molar using calcium enriched mixture cement. *Eur Arch Paediatr Dent*. 2013;14(3):191-194.
5. Li Y, Sui B, Dahl C, et al. Pulpotomy for carious pulp exposures in permanent teeth: a systematic review and meta-analysis. *J Dent*. 2019;84:1-8.
6. Utneja S, Nawal RR, Talwar S, et al. Current perspectives of bioceramic technology in endodontics: calcium enriched mixture cement - review of its composition, properties and applications. *Restor Dent Endod*. 2015;40(1):1-13.
7. Asgary S, Hassanizadeh R, Torabzadeh H, et al. Treatment outcomes of 4 vital pulp therapies in mature molars. *J Endod*. 2018;44(4):529-535.
8. Rodd HD, Boissonade FM. Immunocytochemical investigation of immune cells within human primary and permanent tooth pulp. *Int J Paediatr Dent*. 2006;16(1):2-9.
9. Rodd HD, Boissonade FM. Vascular status in human primary and permanent teeth in health and disease. *Eur J Oral Sci*. 2005;113(2):128-134.
10. Asgary S, Ansari G, Tavassoli-Hojjati S, et al. Clinical applications of hydraulic calcium silicate–based biomaterials in paediatric endodontics. *ENDO Endod Pract Today*. 2020;14(3):229-241.
11. Asgary S, Eghbal MJ, Ghoddusi J. Two-year results of vital pulp therapy in permanent molars with irreversible pulpitis: an

ongoing multicenter randomized clinical trial. *Clin Oral Investig*. 2014;18(2):635-641.
12. Nosrat A, Asgary S. Apexogenesis of a symptomatic molar with calcium enriched mixture. *Int Endod J*. 2010;43(10):940-944.
13. Asgary S, Fazlyab M, Sabbagh S, et al. Outcomes of different vital pulp therapy techniques on symptomatic permanent teeth: a case series. *Iran Endod J*. 2014;9(4):295-300.
14. Memarpour M, Fijan S, Asgary S, et al. Calcium-enriched mixture pulpotomy of primary molar teeth with irreversible pulpitis. A clinical study. *Open Dent J*. 2016;10:43-49.
15. Asgary S, Verma P, Nosrat A. Treatment outcomes offull pulpotomy as an alternative to tooth extraction in molars with hyperplastic/irreversible pulpitis: A Case Report. *Iran Endod J*. 2017;12(2):261-265.
16. Asgary S, Parirokh M, Eghbal MJ, et al. SEM evaluation of pulp reaction to different pulp capping materials in dog's teeth. *Iran Endod J*. 2006;1(4):117-123.
17. Aminabadi NA, Parto M, Emamverdizadeh P, et al. Pulp bleeding color is an indicator of clinical and histohematologic status of primary teeth. *Clin Oral Investig*. 2017;21(5):1831-1841.
18. Mutluay M, Arikan V, Sari S, et al. Does achievement of hemostasis after pulp exposure provide an accurate assessment of pulp inflammation? *Pediatr Dent*. 2018;40(1):37-42.
19. Guthrie TJ, McDonald RE, Mitchell DF. Dental pulp hemogram. *J Dent Res*. 1965;44:678-682.
20. Jeffrey AD. Treatment of deep caries, vital pulp exposure, and pulpless teeth. In: Jeffrey AD, David RA, Ralph EM, eds. *McDonald and Avery's dentistry for the child and adolescent*, (10th edn). Elsevier; 2016:228.
21. Magnusson B. Attempts to predict prognosis of pulpotomy in primary molars. Bacteriologic and histologic examination. *Scand J Dent Res*. 1970;78(3):232-240.
22. Chueh LH, Chiang CP. Histology of irreversible pulpitis premolars treated with mineral trioxide aggregate pulpotomy. *Oper Dent*. 2010;35(3):370-374.
23. Eidelman E, Ulmanksy M, Michaeli Y. Histopathology of the pulp in primary incisors with deep dentinal caries. *Pediatr Dent*. 1992;14(6):372-375.
24. Granath LE, Hagman G. Experimental pulpotomy in human bicuspids with reference to cutting technique. *Acta Odontol Scand*. 1971;29(2):155-163.
25. Cardoso-Silva C, Barberia E, Maroto M, et al. Clinical study of Mineral Trioxide Aggregate in primary molars. Comparison between Grey and White MTA–a long term follow-up (84 months). *J Dent*. 2011;39(2):187-193.
26. Holan G, Eidelman E, Fuks AB. Long-term evaluation of pulpotomy in primary molars using mineral trioxide aggregate or formocresol. *Pediatr Dent*. 2005;27(2):129-136.
27. Akcay M, Celik BN, Sari S, et al. Management of internal resorption observed after a mineral trioxide aggregate pulpotomy in a primary molar tooth: A case report with a 36-month follow-up. *J Pediatr Dent*. 2016;4(1):14-17.
28. Caicedo R, Abbott PV, Alongi DJ, et al. Clinical, radiographic and histological analysis of the effects of mineral trioxide aggregate used in direct pulp capping and pulpotomies of primary teeth. *Aust Dent J*. 2006;51(4):297-305.
29. Shamszadeh S, Parhizkar A, Mardani M, et al. Dental considerations after the outbreak of 2019 Novel Coronavirus Disease: a review of literature. *Arch Clin Infect Dis*. 2020;15(2):e103257.
30. Yu J, Zhang T, Zhao D, et al. Characteristics of endodontic emergencies during coronavirus disease 2019 outbreak in Wuhan. *J Endod*. 2020;46(6):730-735.
31. Asagry S, Shamszadeh S. COVID-19 and endodontic emergencies. *Iran Endod J*. 2020;15(2):64.

How to cite this article: Asgary S, Sarraf Shirazi A, Sabbagh S. Management of primary molars with irreversible pulpitis employing tampon pulpotomy: Report of three cases with 34-month mean follow-up. *Clin Case Rep*. 2021;9:2289–2294. https://doi.org/10.1002/ccr3.4017