Journal of Dental Sciences

Volume 21 | Issue 2 Article 66

Long-term treatment outcomes of tampon pulpotomy in permanent molars with irreversible pulpitis: A case report

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Journal of Dental Sciences 21 (2026) 1246–1248

Available online at https://jds.ads.org.tw/journal/

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KEYWORDS
Calcium silicate;
Mineral trioxide aggregate;
Pulpotomy;
Vital pulp therapy;
Permanent molar

Vital pulp therapy (VPT) in primary as well as permanent teeth diagnosed with irreversible pulpitis remains controversial, particularly in pediatric patients. Nevertheless, increasing evidence supports conservative and biologically pulp-preserving approaches when appropriate case selection and biocompatible materials are employed.[1,2] This correspondence article reported the 8-year clinical and radiographic success of tampon pulpotomy in two permanent first molars of an adolescent patient.

An 11-year-old medically healthy female presented with spontaneous severe pain in the left maxillary permanent first molar (tooth 26) and mild lingering thermal pain in the right mandibular permanent first molar (tooth 46). Preoperative periapical radiographs are shown in Fig. 1A. The tooth 26 exhibited extensive caries with radiographic pulp exposure, a normal periodontal ligament (PDL) space, and a moderate restorative prognosis. Clinically, the tooth 26 was diagnosed with symptomatic irreversible pulpitis due to spontaneous high-intensity pain that interfered with daily activities, particularly at night. The tooth 46 demonstrated extremely deep caries with a high risk of pulp exposure, evident PDL widening, and a favorable restorative prognosis. Clinically, it presented with symptoms consistent with irreversible pulpitis, including prolonged response to thermal stimuli. Treatment options, including root canal treatment and VPT, were explained to the parents, who elected for conservative VPT. Written informed consent was obtained. The patient's medical history was noncontributory.

Treatment was performed over multiple visits. The tooth 26 received direct pulp capping with calcium-enriched mixture (CEM) cement (BioniqueDent, Tehran, Iran), followed by definitive resin composite restoration (two months after the initial visit). The tooth 46 underwent partial pulpotomy using the tampon technique with CEM cement to achieve hemorrhage control and pulp preservation, as bleeding could not be controlled after 5 min despite application of sodium hypochlorite. Due to extensive coronal structure loss, an extrapulpal pin was placed to support the resin composite restoration, which was completed four months after the first visit. Immediate postoperative periapical radiographs are presented in Fig. 1B. The tampon approach is based on emerging evidence suggesting that the prolonged pulpal bleeding does not necessarily preclude successful VPTs.[3,4]

Regular follow-up visits were not possible because the patient did not attend scheduled recalls. At the 8-year follow-up, both teeth were asymptomatic and fully functional. The tooth 26 responded within normal limits to sensibility testing. No tenderness to percussion or palpation, pathological mobility, or discoloration was detected. Periapical radiographs (Fig. 1C) demonstrated normal PDL space, complete periapical healing, and

https://doi.org/10.1016/j.jds.2026.02.006

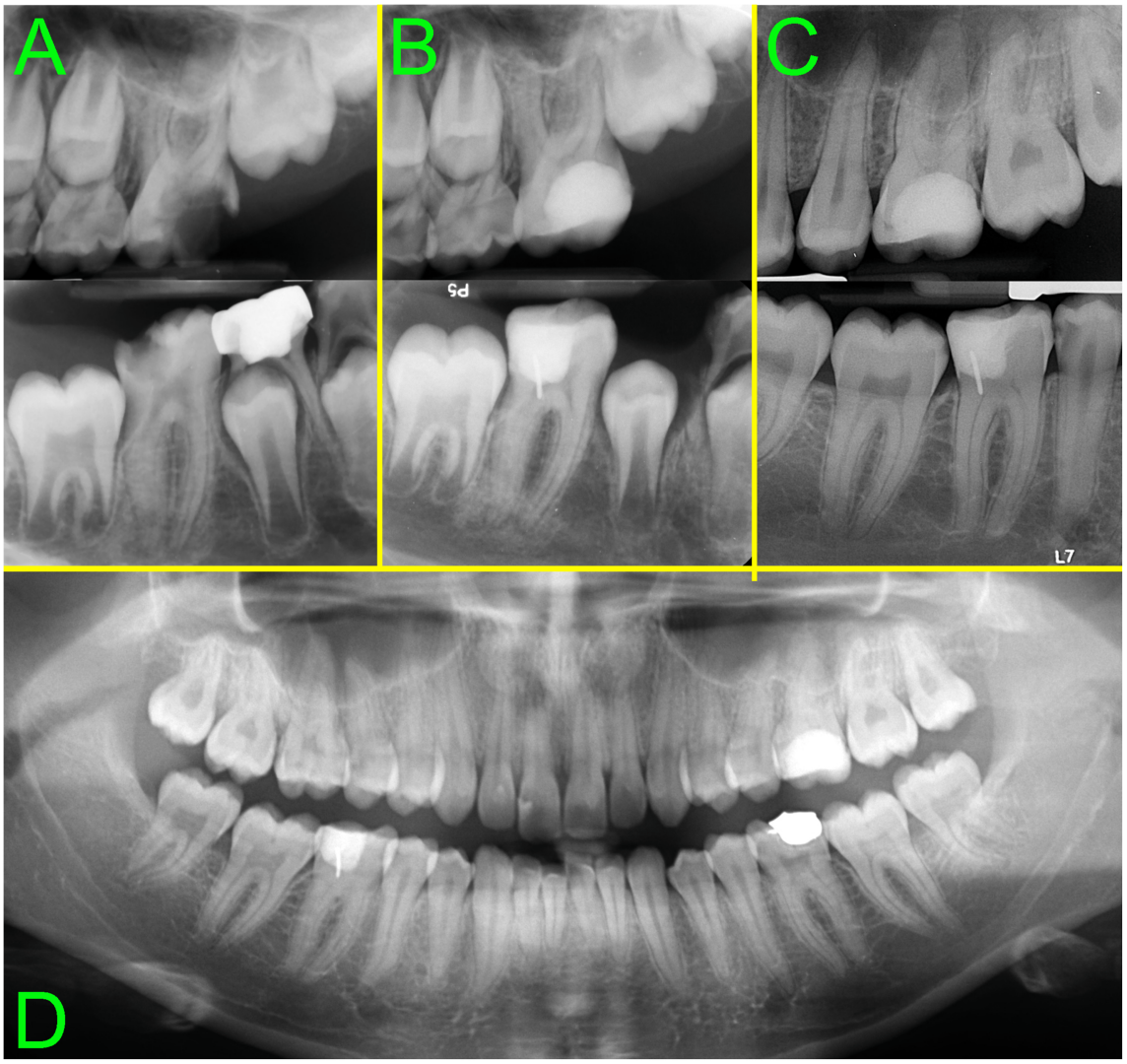

Figure 1 Radiographic sequence illustrating diagnosis, treatment, and 8-year follow-up after tampon pulpotomy in the permanent first molars. (A) Preoperative periapical radiographs of the left maxillary and right mandibular permanent first molars (tooth 26 and tooth 46). The tooth 26 showed extensive caries with radiographic pulp exposure and normal periodontal ligament space, while the tooth 46 presented with extremely deep caries and clear periodontal ligament widening. (B) Immediate postoperative periapical radiographs. The tooth 26 after direct pulp capping with calcium-enriched mixture (CEM) cement and resin composite restoration, and the tooth 46 after partial pulpotomy using the tampon technique with CEM cement, followed by resin composite restoration supported by an extra-pulpal pin. (C) Eight-year follow-up periapical radiographs demonstrating normal periodontal ligament space, absence of periapical pathology, and physiological eruption of adjacent teeth. (D) Orthopantomogram at the 8-year follow-up confirming the long-term radiographic success of both treated molars.

physiological eruption of adjacent teeth. No evidence of internal or external resorption, calcific metamorphosis, or periapical pathology was observed. Although extensive calcification of the pulp chamber was evident in the tooth 46, the root canals remained discernible (Fig. 1C). An orthopantomogram obtained at the same follow-up interval further confirmed the long-term radiographic success (Fig. 1D).

The results of this case demonstrate that the permanent molars presenting with clinical features traditionally associated with irreversible pulpitis and prolonged intraoperative bleeding may still achieve favorable long-term outcomes following conservative VPTs.[5] The tampon pulpotomy approach, in conjunction with biocompatible materials and durable restorations, may represent a viable treatment option for selected young permanent teeth and supports a biologically driven reconsideration of pulp management strategies.

Declaration of competing interest

The authors have no conflicts of interest relevant to this paper.

Acknowledgments

None.

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Received 3 February 2026
Final revision received 8 February 2026
Available online 1 April 2026