

Complete Coronal Pulpotomy as Vital Pulp Therapy in a Mature Mandibular Molar: Images in Medicine

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A 31-year-old female patient experienced pain in the right posterior mandibular region for four to five days, which was spontaneous, lingering, throbbing, non-radiating in nature, aggravated by intake of cold and hot beverages. Medical and dental histories were non-contributory, with no history of trauma, swelling or medication use. A clinical examination revealed a carious lesion in the right mandibular first molar (tooth 46). There was no tenderness to percussion, and electric pulp testing produced an elevated response relative to the contralateral tooth, signifying a vital yet inflamed pulp. A preoperative intraoral periapical radiograph showed a deep carious lesion approximating and involving the pulp chamber, with intact lamina dura, no widening of the periodontal ligament space or periapical radiolucency [Table/Fig-1a], confirming the absence of apical pathology [1-3]. The diagnosis of symptomatic irreversible pulpitis with normal apical tissues was established based on these observations, in accordance with the diagnostic criteria given by the American Association of Endodontists (AAE) [1]. A complete coronal pulpotomy was planned due to the favourable periapical condition and in order to maintain pulp vitality [2,4].

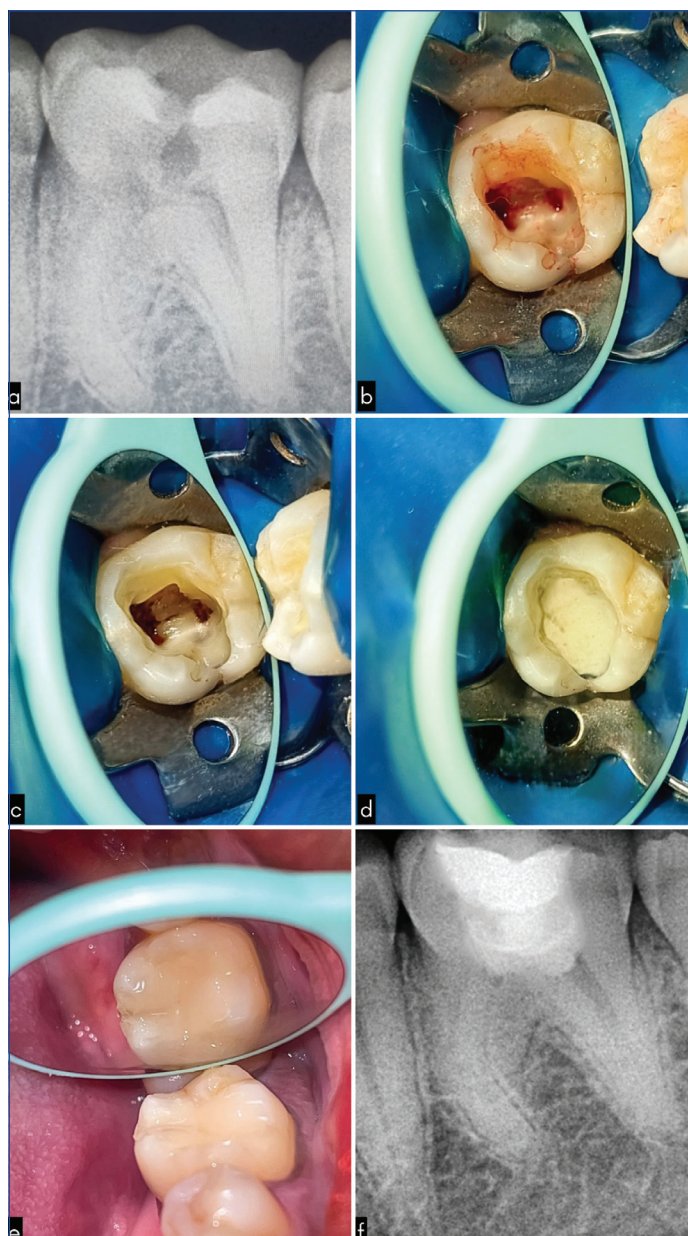
Before rubber dam isolation, local anaesthesia was delivered with 2% lignocaine (Xylocaine) with 1:200,000 adrenaline. The access cavity was prepared, and pulp tissue from the coronal portion was removed, revealing the inflammatory radicular pulp tissue [Table/Fig-1b]. Sterile saline was used to irrigate the pulp chamber in order to remove debris and pulpal remains. Haemostasis was attained by applying a cotton pellet soaked with 3% sodium hypochlorite over the canal orifices for five minutes, indicating controlled bleeding and a favourable state of the radicular pulp [Table/Fig-1c] [2,4].

Mineral Trioxide Aggregate (MTA) (Angelus, Londrina, Brazil) was prepared on a glass slab by mixing the powder with distilled water to achieve a uniform consistency. The pulp chamber floor and canal orifices were carefully condensed with a 3-4 mm-thick layer of MTA to establish a biological seal over the residual radicular pulp [Table/Fig-1d]. For adequate setting, a moist cotton pellet was placed over the MTA, and a temporary restorative material was used to seal the cavity. At the subsequent visit after 24 hours, the cavity was restored using resin-modified glass ionomer cement (GC Corporation, Tokyo, Japan), followed by composite resin (Spectrum, Dentsply Sirona, USA) to provide adequate coronal seal [Table/Fig-1e]. A postoperative radiograph immediately revealed the satisfactory placement of the restoration [Table/Fig-1f] [4].

The patient was evaluated on the next day and reported no pain or swelling after the procedure. At three- and six-month follow-up visits, the tooth was asymptomatic and non-tender to percussion. The six-month radiograph showed a normal periodontal ligament space and no signs of periapical pathology [Table/Fig-2]. This suggests that the pulp vitality was well preserved [2,5].

The various phases of a full coronal pulpotomy in a mature permanent molar with irreversible pulpitis are depicted in this

clinical image. Root canal treatment has been the preferred treatment for these cases, but it involves removal of inflamed pulp tissue, which makes the tooth non-vital. On the other hand, the goals of vital pulp therapy are to maintain a healthy radicular pulp so that it retains its immunity, hydration, and proprioceptive functions [2,3].



[Table/Fig-1]: a) Preoperative radiograph showing deep carious lesion involving the pulp chamber in tooth 46; b) Access cavity after coronal pulp exposure under rubber dam isolation; c) Removal of inflamed coronal pulp tissue; d) Placement of MTA over the pulp chamber floor; e) Postoperative clinical view after definitive coronal restoration; and f) Immediate postoperative radiograph confirming adequate coronal seal.



[Table/Fig-2]: Six-month follow-up radiograph showing normal periapical structures after complete coronal pulpotomy.

Vital pulp therapy for permanent mature teeth involves different methods depending on extent of inflammation and exposure of pulp. These methods include indirect pulp capping, direct pulp capping, partial pulpotomy and complete pulpotomy. In case of irreversible pulpitis with no apical pathology in which haemostasis can be achieved within 10 minutes, complete pulpotomy using bioactive materials such as MTA has shown favourable outcomes. Complete coronal pulpotomy eliminates the inflamed coronal pulp while preserving the radicular pulp, which has significant healing potential when sealed with a biocompatible material [2,4,6].

MTA is particularly suitable for pulpotomy because of its excellent sealing properties, biocompatibility, and ability to promote hard tissue formation. It establishes an alkaline environment and releases calcium ions, facilitating dentine bridge formation and pulpal healing [4]. Effective haemostasis serves as a crucial prognostic indicator since extended bleeding suggests significant inflammation; in this case, the bleeding was controlled within five minutes, suggesting a favourable outcome [2,4]. Research has shown positive outcomes of complete pulpotomy using MTA in mature permanent molars with irreversible pulpitis. Eghbal MJ and Asgary S demonstrated successful clinical and radiographic results in such cases [4]. Current evidence and guidelines support complete pulpotomy as a less invasive alternative to root canal therapy in selected cases [2,4]. This case demonstrates that a mature mandibular molar with symptomatic irreversible pulpitis can be successfully managed with complete coronal pulpotomy using MTA, thereby preserving pulp vitality and avoiding root canal therapy.

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