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Managing limited clinical crown height with vital pulp therapy: Clinical application and outcome

KEYWORDS

Vertical dimension loss;
Vital pulp therapy;
Calcium silicate;
Root canal therapy

When there is reduced clinical crown height or insufficient interocclusal space due to the opposing dentition, it can adversely affect the fabrication and retention of prosthetic restorations such as crowns or inlays, and may also compromise occlusal function and esthetics. Common treatment approaches include occlusal adjustment of the opposing tooth and/or the incorporation of vital pulp therapy (VPT).

VPT is a minimally invasive treatment approach designed to preserve the health and function of the dental pulp when compromised by factors such as deep caries, trauma, or dental procedures. By maintaining pulp vitality in both primary and permanent teeth, VPT has the potential to obviate the need for root canal treatment. Techniques under the VPT umbrella—including indirect and direct pulp capping (IPC/DPC), as well as miniature, partial, and full pulpotomy (MP/PP/FP)—have demonstrated promising clinical outcomes.¹

In vital pulp therapy, the traditionally used material has been calcium hydroxide, appreciated for its antibacterial properties and its ability to stimulate hard tissue formation. However, in recent years, calcium silicate-based materials such as mineral trioxide aggregate (MTA, Dentsply Sirona Co., York, PA, USA), Biodentine (Septodont, Saint-Maur-des-Fossés, France), and calcium-enriched mixture (CEM, BioniqueDent Co. Tehran, Iran) cement have become increasingly popular. These bioactive endodontic materials promote pulp healing, enhance dentinogenesis, and provide

long-term sealing integrity, making them highly suitable for VPT in both primary and permanent dentitions.²

Fig. 1 illustrates a case in which insufficient clinical crown height in the region of teeth #16 and #17 was identified following implant fixture placement. The patient was referred from the prosthetic department to the endodontic department. As the patient declined orthodontic intrusion of teeth #46 and #47 to gain vertical restorative space, assistance from the endodontic team was sought. Under local infiltration anesthesia, a rubber dam was placed to achieve complete isolation and prevent salivary contamination. Using a high-speed handpiece, the occlusal surface was reduced until the pulp was nearly or fully exposed. The pulp tissue's condition and bleeding response were assessed. Hemostasis was achieved by gently applying sterile cotton pellets soaked in either normal saline or sodium hypochlorite for approximately 5 min. Biodentine, a bioactive material, was then placed over the exposed pulp, and the cavity was sealed with a composite resin restoration as the final layer.

At the one-month follow-up, both clinical and radiographic evaluations confirmed that the tooth remained vital and functionally normal. This outcome is consistent with the previous studies reporting the overall clinical and radiographic VPT success rates ranging from 81 % to 96 %, when various techniques and materials are employed, as demonstrated in multiple randomized controlled trials and systematic reviews.³

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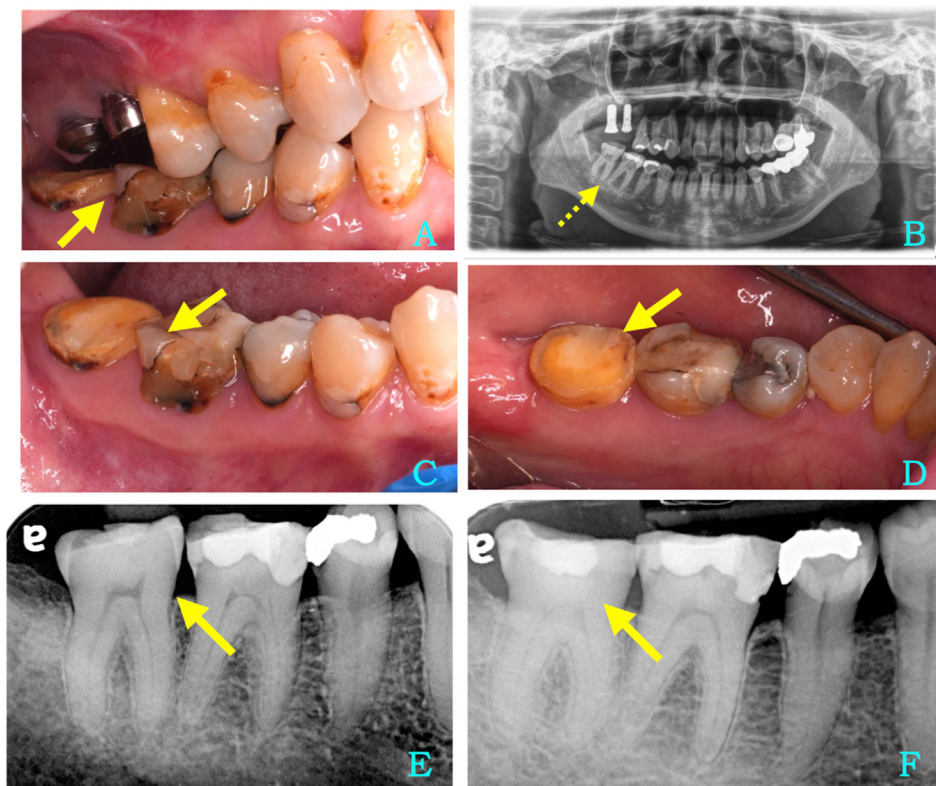


Figure 1 Due to insufficient clinical crown height in the area of teeth #16 and #17 following implant fixture placement, the patient was referred from the Prosthetic Department to the Endodontic Department. The patient declined orthodontic treatment to intrude teeth #46 and #47 in order to gain vertical restorative space. Therefore, assistance from the endodontic team was requested. After interdisciplinary discussion, the patient agreed to undergo vital pulp therapy (VPT) on tooth #47 to reduce the clinical crown height.

A: Clinical photograph showing insufficient clinical crown height at the implant sites of teeth #16 and #17.

B: Full-mouth panoramic radiograph reveals excessive crown height of tooth #47.

C: Buccal view of the lower posterior teeth after VPT on tooth #47, showing crown reduction by occlusal trimming.

D: Lingual view of the lower posterior teeth.

E: Preoperative periapical radiograph before VPT, demonstrating prominent mesial crown contour.

F: Postoperative periapical radiograph after VPT showing successful crown height reduction; vitality tests were normal, with no signs of apical pathology.

Therefore, performing vital pulp therapy on the opposing tooth is considered an acceptable approach to address the issue of insufficient vertical dimension between occluding teeth. VPT continues to be a promising alternative to more invasive procedures such as complete pulpectomy, root canal treatment (RCT), or tooth extraction.

Declaration of competing interest

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

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