

Pulpotomy in Primary Teeth: Current Perspectives and Clinical Outcomes

Aymen Ben Hadj Khalifa^{1,2*}, Hanan Boukhris³, Marwa Chatti², Hana Moalla^{1,2}, Ghada Ayari³, Ahlem Baaziz²

¹Department of Dental Anatomy, Faculty of Dental Medicine of Monastir, University of Monastir

²Pediatric Dentistry Department, Faculty of Dental Medicine of Monastir, University of Monastir

³Faculty of dental Medicine of Monastir, University of Monastir

| | |
|---|---|
| <p>Abstract: Pulpotomy remains a cornerstone treatment for managing pulpitis in primary teeth, with recent advances in bioactive materials significantly improving clinical outcomes. This communication reviews current evidence regarding pulpotomy success rates and material selection in primary dentition.</p> | <p>Short Communication</p> <p>*Corresponding Author: <i>Aymen Ben Hadj Khalifa</i> Department of Dental Anatomy, Faculty of Dental Medicine of Monastir, University of Monastir</p> <p>How to cite this paper: Aymen Ben Hadj Khalifa <i>et al</i> (2025). Pulpotomy in Primary Teeth: Current Perspectives and Clinical Outcomes. <i>Middle East Res J. Dent</i>, 5(5): 57-58.</p> <p>Article History: Submit: 28.08.2025 Accepted: 25.09.2025 Published: 27.10.2025 </p> |
| <p>Keywords: Pulpotomy, Primary Teeth, Pulpitis, Vital Pulp Therapy (VPT), Coronal Pulp, Pulp Healing.</p> | <p>Copyright © 2025 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.</p> |

INTRODUCTION

Pulpotomy is a vital pulp therapy technique that involves the removal of the coronal pulp while preserving the radicular pulp tissue [5]. In primary teeth, this procedure is indicated for teeth with reversible pulpitis or carious exposures where the radicular pulp remains healthy [2-9]. The success of pulpotomy largely depends on accurate diagnosis, proper case selection, and the choice of pulpotomy material [1-4].

Current Evidence and Clinical Outcomes

Recent systematic reviews and clinical trials have demonstrated high success rates for pulpotomy in primary teeth [3, 4]. A 2024 systematic review and meta-analysis revealed that pulpotomy can be considered an effective alternative modality for treating primary teeth with irreversible pulpitis, challenging traditional treatment approaches [3].

Material Selection: MTA vs. Biodentine

The introduction of calcium silicate-based materials has revolutionized pulpotomy procedures [2-8]. Current evidence indicates that both Mineral Trioxide Aggregate (MTA) and Biodentine demonstrate excellent clinical outcomes [1-6]:

- **MTA:** Clinical and radiographic success rates of 100% have been reported at 24-month follow-up periods in several studies [1-9]. However, tooth discoloration remains a notable concern with MTA use [2-10].

- **Biodentine:** Shows comparable success rates to MTA, with clinical and radiographic success rates of 89.4% at 24 months [6]. Biodentine offers the advantage of reduced discoloration potential compared to MTA [2-6].

A comprehensive meta-analysis comparing MTA and Biodentine found no significant differences in clinical success rates at 12 and 18 months (RR = 1.01; 95% CI = 0.97-1.04, p = 0.77 and RR = 0.98; 95% CI = 0.92-1.05, p = 0.74, respectively) [4].

Long-Term Outcomes

Studies with extended follow-up periods demonstrate sustained success rates [1-9]. For vital pulp therapies in primary teeth with deep caries, both MTA and Biodentine show superior outcomes compared to traditional materials like ferric sulfate or formocresol [2-8].

Clinical Implications

The current evidence supports the use of calcium silicate-based materials as the gold standard for pulpotomy in primary teeth [3-5]. The choice between MTA and Biodentine may be influenced by aesthetic considerations, with Biodentine preferred in anterior teeth due to reduced discoloration potential [2-6].

CONCLUSION

Pulpotomy using bioactive calcium silicate materials represents a highly successful treatment modality for primary teeth with pulpitis [3-5]. Both MTA and Biodentine demonstrate excellent clinical and radiographic success rates, offering pediatric practitioners reliable options for preserving primary tooth vitality [1-9]. Future research should focus on long-term follow-up studies and novel bioactive materials to further optimize treatment outcomes [7, 8].

REFERENCES

1. Eshghi A, *et al.*, Comparison of Clinical and Radiographic Success between MTA and Biodentine in Pulpotomy of Primary Mandibular Second Molars with Irreversible Pulpitis: A Randomized Double-Blind Clinical Trial. *Int J Dent.* 2022; 2022:6963944. DOI: 10.1155/2022/6963944
2. Cuadros-Fernández C, *et al.*, The evaluation of MTA and Biodentine as a pulpotomy materials for carious exposures in primary teeth. *Clin Oral Investing.* 2018;22(5):2437-2444. DOI: 10.1007/s00784-018-2472-4
3. Treatment Outcomes of Pulpotomy in Primary Teeth with Irreversible Pulpitis: A Systematic Review and Meta-Analysis. *Children (Basel).* 2024;11(5):574. DOI: 10.3390/children11050574
4. Peng C, *et al.*, MTA and biodentine for primary teeth pulpotomy: a systematic review and meta-analysis of clinical trials. *Braz Dent J.* 2018;29(4):342-352. DOI: 10.1590/0103-6440201802277
5. Use of Vital Pulp Therapies in Primary Teeth 2024. *Pediatr Dent.* 2024;46(1):8-16.
6. Randomized Clinical Study of the Use of MTA and Biodentine™ for Pulpotomy in Primary Teeth. *Pesqui Bras Odontopediatria Clín Integr.* 2023;23:e220024. DOI: 10.1590/pboci.2023.057
7. Analysis of Pediatric Pulpotomy, Pulpectomy, and Extractions in Primary Teeth Revealed No Significant Association with Subsequent Root Canal Therapy and Extractions in Permanent Teeth: A Retrospective Study. *Children (Basel).* 2024;11(2):251. DOI: 10.3390/children11020251
8. Comparison of bioactive material failure rates in vital pulp treatment of permanent matured teeth – a systematic review and network meta-analysis. *Sci Rep.* 2024; 14:18346. DOI: 10.1038/s41598-024-69063-8
9. Evaluation and comparison of mineral trioxide aggregate and biodentine in primary tooth pulpotomy: Clinical and radiographic study. *J Family Med Prim Care.* 2018;7(1):144-148. DOI: 10.4103/jfmpe.jfmpe_299_17
10. A comparison of MTA and Biodentine as medicaments for pulpotomy in traumatized anterior immature permanent teeth: A randomized clinical trial. *Dent Traumatol.* 2020;36(4):400-409. DOI: 10.1111/edt.12550