

## VITAL PULPTHERAPY: MODERNTRENDS

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**Abstract:** To analyze modern trends and the evolution of materials used in vital pulp therapy. A review of clinical studies and meta-analyses conducted between 1960 and 2016 with a 12-month follow-up period was performed. The review highlights the shift from traditional materials like formocresol to bioactive materials such as Mineral Trioxide Aggregate (MTA) and Biodentine. MTA demonstrated superior biocompatibility and reparative properties compared to calcium hydroxide. Vital pulp therapy remains a biologically oriented and reliable approach, with modern biomaterials significantly improving clinical outcomes. **Keywords:** Vital pulp therapy, pulpotomy, mineral trioxide aggregate (MTA), formocresol, pulpitis, bioceramics, apexogenesis, primary teeth, dentistry, bioactive materials.

**1. INTRODUCTION** The carious process remains one of the most prevalent dental diseases worldwide. This pathology is detected in more than 90% of patients seeking dental care due to pain. Despite successful caries treatment, statistics indicate that more than 70% of patients reapply for dental care because of disease recurrence [1]. Consequently, pulpitis treatment is considered one of the most frequently performed dental interventions. Historically, vital pulp therapy has utilized various varnishes and cements (since the 19th century), but the long-term success of these methods compared to high-quality endodontic treatment has been questioned by some authors [2, 3]. However, the field has undergone significant progress recently due to the development of new biomaterials combined with advanced adhesive technologies [4]. The aim of this study was to analyze modern trends in vital pulp therapy and evaluate the evolution of materials used for this procedure.

## **2. MATERIAL AND METHODS**

To achieve the study objective, we conducted a systematic review of clinical studies published between 1960 and 2016.

- **Inclusion Criteria:** The review focused on studies with a minimum follow-up period of 12 months.

- **Data Analysis:** A meta-analysis was performed on the selected studies to evaluate the effectiveness of various pulpotomy agents, ranging from traditional formocresol to modern bioceramics.

- Subjects: The review covered interventions in both primary and permanent teeth, analyzing complications, success rates, and histological responses of pulp tissue.

## **RESULTS**

The analysis of the literature revealed a distinct evolution in pulp therapy materials and techniques over the decades: 3.1. Historical Evolution of Materials

- 1969–1970: Introduction of chemotherapeutic mixtures with corticosteroids (Virolainen K. et al.) and N2 material (Hannah D.R.).

- 1975–1986: Focus on glucocorticoid-antibiotic mixtures for vital amputation of posterior teeth (Barker B.C.; Holland R. et al.).

- 1993: Introduction of Mineral Trioxide Aggregate (MTA) into dental practice, marking a significant turning point.

- 1994–1996: Proposals for tricalcium phosphate combined with calcium hydroxide and hydroxyapatite to promote dentin barrier formation.

- 2000–2003: Shift towards ferric sulfate and iodoform-based pastes. Histological studies began to demonstrate the superiority of MTA.

- 2004–2017: Widespread confirmation of the high effectiveness of MTA, Biodentine, CEMcement, and bioceramics.

3.2. Current Classification and Techniques Currently, two main types of pulpotomy are distinguished based on the extent of pulp removal:

1. Complete Pulpotomy: Considered the most appropriate approach for permanent teeth with fully formed apices.

2. Partial Pulpotomy: Indicated for teeth with incomplete root development, utilizing techniques such as 1- and 5-minute formocresol applications.

3.3. Efficacy Findings The meta-analysis results demonstrated that for all types of pulpotomy in primary teeth, MTA and formocresol remain the most effective materials.

## **4. DISCUSSION**

The review highlights that the choice of material significantly influences the outcome of vital pulp therapy.

4.1. Advantages of Modern Materials Modern biomaterials, particularly MTA, exhibit lower cytotoxicity compared to traditional calcium hydroxide (de Souza Costa C.A. et al., 2008). Histological and in vivo studies have consistently demonstrated superior pulp healing and successful apexogenesis with MTA and CEM cement compared to older methods.

4.2. Limitations and Challenges Despite the progress, certain limitations persist:

- Antibacterial Activity: Some studies indicate that MTA has limited antibacterial activity against cariogenic bacteria compared to some traditional agents

. • Study Interpretation: As noted by Miyashita H. et al. (2016), interpreting clinical studies is difficult due to the challenge of creating ideal clinical conditions for evaluating pulpotomy materials.

• Lack of Specific Data: Studies focusing specifically on pulpotomy in cariously affected teeth (as opposed to mechanically exposed healthy pulps) were largely absent in the reviewed literature.

### 3. CONCLUSION

In conclusion, the effectiveness of treating cariously affected teeth using modern pulp therapy methods and materials outweighs the identified limitations. Vital pulp therapy represents a biologically oriented, reliable, and promising approach in contemporary dentistry. The transition from cytotoxic agents (like formocresol) to bioactive materials (like MTA and Biodentine) ensures better long-term preservation of tooth vitality.

### REFERENCES

1. Bondarenko T.N., Melekhov S.V. Comprehensive assessment of dental status in patients with pulpitis in the context of treatment methods. *Kuban Scientific Medical Bulletin*. 2009;7:19-21.
2. Bazhenova N.P. Clinical and morphological evaluation of vital pulp amputation. *Kuban Scientific Medical Bulletin*. 2001;3(57):30-31
3. Sevastyanova I.K. Vital methods of pulpitis treatment in primary teeth. Abstract of Cand. Med. Sci. Dissertation. Krasnodar; 1999.
4. Cao Y., Bogen G., Lim J., Shon W.J., Kang M.K. Bioceramic materials and the changing concepts in vital pulp therapy. *J Calif Dent Assoc*. 2016;44:279-290.