

INTRODUCTION:

Vital Pulp Therapy (VPT) aims to preserve pulp vitality and maintain function in primary teeth. The three accepted VPT procedures include direct pulp cap, indirect pulp cap, and pulpotomy. The focus of treatment has evolved from simple pulp preservation to biologic regeneration, with bioactive materials such as MTA and Biodentine widely used for this purpose.

MTA is considered the gold standard due to its excellent biocompatibility, bioactivity, sealing ability, and low solubility. Biodentine was developed as an improved calcium silicate-based alternative with better handling and physical properties. It offers good sealing ability, resistance to microleakage, antimicrobial effects, and an alkaline pH (~12), making it a reliable dentin substitute for vital pulp therapy.

METHOD:

- A randomized split-mouth design was employed, involving 64 pairs of carious primary molars from 49 pediatric patients
- In each pair, one molar received MTA (Avalon Biomed NeoPUTTY), and the contralateral molar received Biodentine (Biodentine™ XP 200 by Septodont) for either pulpotomy or indirect pulp capping
- All teeth were restored with stainless-steel crowns. Treatments were performed under general anesthesia in the operating room
- Clinical and radiographic evaluations were conducted at 6-, 12-, 18-, and 24-month intervals

CONCLUSION:

This randomized controlled study demonstrated that Biodentine is a viable alternative vital pulp therapy material, and can overcome the limitations associated with MTA, such as high cost, tooth discoloration, and challenges in anterior tooth applications.

RESULTS:

Table 1. Distribution of material and primary molar type in VPT treatments overall and within each procedure type (IPC vs pulpotomy) (n = 128)

Characteristic	Overall N = 128 ¹	IPC N = 70 ¹	Pulpotomy N = 58 ¹
Material, n (%)			
Biodentine	64 (50%)	35 (50%)	29 (50%)
MTA	64 (50%)	35 (50%)	29 (50%)
Primary molar, n (%)			
Maxillary first primary molar	16 (13%)	6 (8.6%)	10 (17%)
Mandibular first primary molar	36 (28%)	10 (14%)	26 (45%)
Maxillary second primary molar	30 (23%)	28 (40%)	2 (3.4%)
Mandibular second primary molar	46 (36%)	26 (37%)	20 (34%)

¹ n (%)

Table 2. Demographics of patients undergoing VPT treatments (n = 49).

Age at treatment (years)	
Median (Q1, Q3)	4.7 (4.1, 5.9)
Mean (SD)	4.9 (1.3)
Min, Max	2.6, 7.9
Gender, n (%)	
Female	20 (41%)
Male	29 (59%)
Race, n (%)	
African American	5 (11%)
White	42 (89%)
(# Missing)	2

The Radiograph on the left is the preoperative radiograph taken in the operating room on the day of the treatment

The radiograph on the right shows #1 that was treated with Biodentine IPC and had failure at 18 months

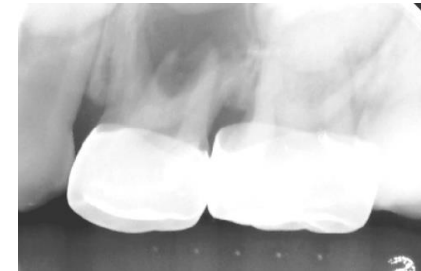


Figure 1- Kaplan-Meier survival estimates for MTA- vs Biodentine-treated IPCs; log-rank test p-value shown in lower left corner.

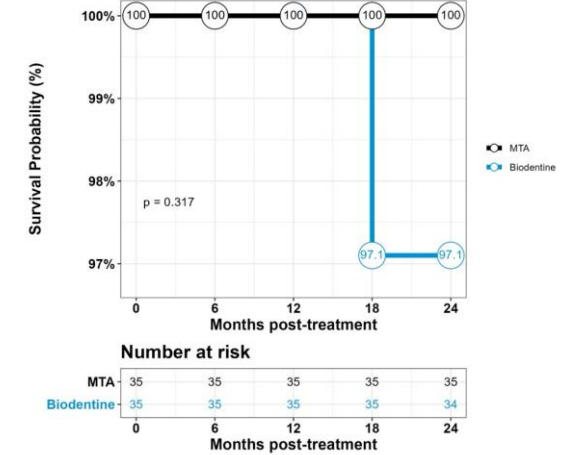


Figure 2-Kaplan-Meier survival estimates for MTA- vs Biodentine-treated Pulpotomies

