



Analysis of Primary and Secondary Hemostasis in Primary Tooth Pulpotomies

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Introduction

The pulpotomy is a treatment option for deep dental caries lesions approximating the pulp in the vital tooth. Primary hemostasis is initially managed through mechanical compression with a cotton pellet. Residual bleeding may compromise the setting of pulp capping materials

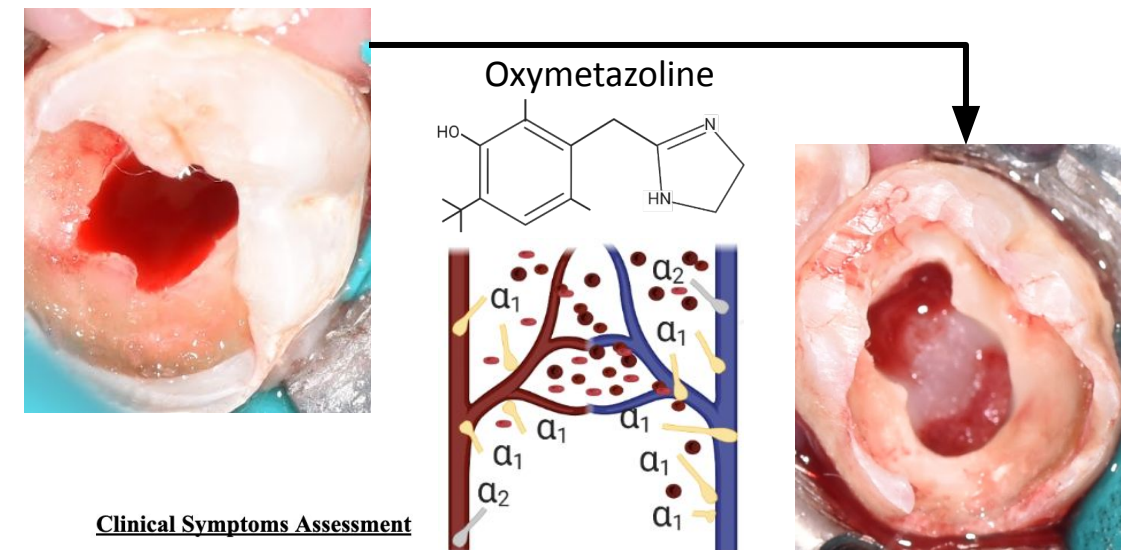
If primary hemostasis is refractory, secondary hemostasis, can be achieved through chemical induced hemorrhage control. **Oxymetazoline (OXY)**, a sympathomimetic alpha-agonist found in OTC nasal spray, may induces transient vasoconstriction, *when applied directly on the dental pulp*, by targeting alpha adrenergic receptors found in the dental pulp.

This *retrospective* study evaluated patient-related predictors for achieving primary hemostasis.

The study also assessed the requirement for and efficacy of 0.05% OXY as a secondary hemostatic agent.

Materials and Methods

- After IRB approval, **66** dental records of children aged 2 to 10 years with at least one primary tooth requiring a pulpotomy were identified. For records with multiple pulpotomy procedures, a single tooth was randomly selected per patient
- Pulpotomies were performed by graduate pediatric dental residents supervised by an attending pediatric dentist.



Clinical Symptoms Assessment

Circle 1 answer per item				
Hx of pain	Y	N		
Location of pain	UR	UL	LL	LR
Type	constant	intermittent	unknown	
Cause	provoked	unprovoked	unknown	
Pain on eating	Y	N	unknown	
Pain med used	Y	N	unknown	
Suppressed pain?	Y	N	unknown	

Primary and Secondary Hemostasis Assessment:

Primary hemostasis (Cotton pellet only)	Tooth _____	Tooth _____	Tooth _____	Tooth _____
Full hemostasis ≥ 60 seconds	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N
Partial hemostasis ≥ 60 seconds	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N
Secondary hemostasis	<input type="checkbox"/> Afm <input type="checkbox"/> Ferric	<input type="checkbox"/> Afm <input type="checkbox"/> Ferric	<input type="checkbox"/> Afm <input type="checkbox"/> Ferric	<input type="checkbox"/> Afm <input type="checkbox"/> Ferric
Full hemostasis ≥ 30 seconds	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N
Partial hemostasis ≥ 30 seconds	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N
Pulp is Hyperemic	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N
Material - over orifices	<input type="checkbox"/> MTA <input type="checkbox"/> IRM	<input type="checkbox"/> MTA <input type="checkbox"/> IRM	<input type="checkbox"/> MTA <input type="checkbox"/> IRM	<input type="checkbox"/> MTA <input type="checkbox"/> IRM
Material - build up	<input type="checkbox"/> IRM <input type="checkbox"/> GI	<input type="checkbox"/> IRM <input type="checkbox"/> GI	<input type="checkbox"/> IRM <input type="checkbox"/> GI	<input type="checkbox"/> IRM <input type="checkbox"/> GI

- Patient-related factors** were documented in EHR: gender, age, pre-operative symptoms, number of caries surfaces, radiographic caries depth, and radiographic caries extension below CEJ.
- The clinical symptom assessment evaluated:
 - Pre-operative symptoms
- Primary and secondary hemostasis assessment evaluated:
 - Status of hemostasis after 60 and 30 seconds respectively.
- Logistic regression** examined how patient-related factors were associated with the outcome of primary hemostasis.
- Dental records indicated the **frequency and efficacy** of additional hemostasis with a application of OXY

Results

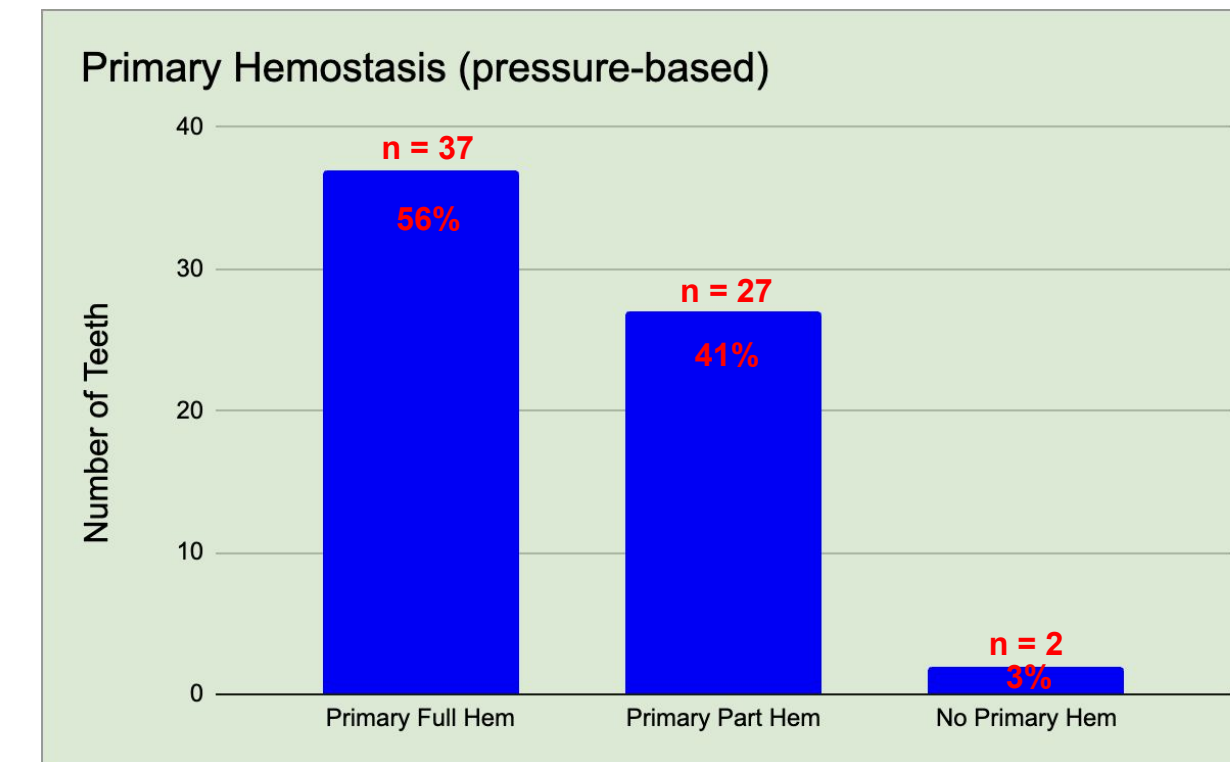


Figure 1. Primary Hemostasis - Full, Partial, None

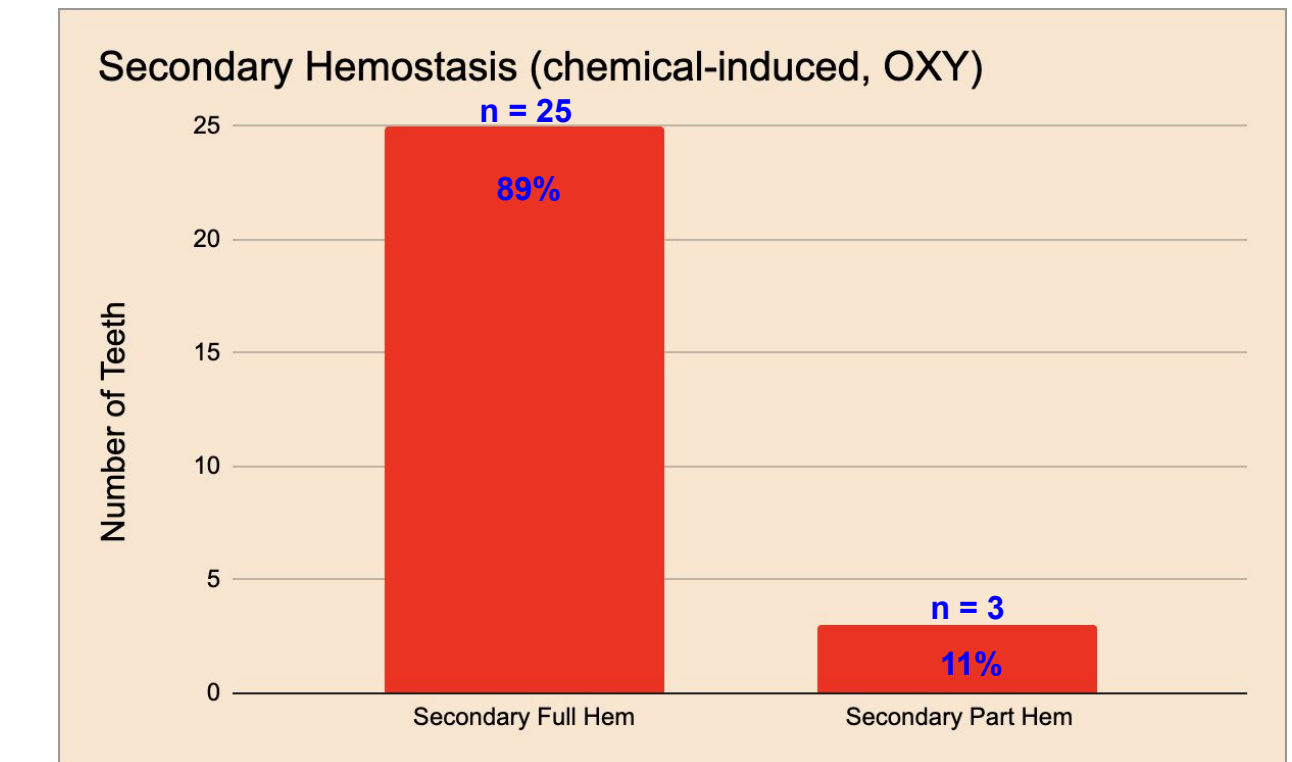


Figure 2. Secondary Hemostasis - Full, Partial

Hemostasis (Primary and Secondary)		TOTAL	Primary Hem	Secondary Hem
		66	%	%
Primary Full Hem	37	56.06%	56.06%	
Primary Part Hem	27	40.91%	40.91%	
No Primary Hem	2	3.03%	3.03%	
Total # of Secondary	28	42.42%		
	Secondary Full Hem	25	37.88%	89.29%
	Secondary Part Hem	3	4.55%	10.71%

Table 1. Primary and Secondary Hemostasis

- Total of **66** teeth were included in the study.
- Primary pressure-based hemostasis after 60 sec was accomplished in 56% (37/66) of pulpotomy cases
- Full secondary hemostasis after 30-60 sec was accomplished in 89.2% (25/28) of pulpotomy greeted with OXY
 - 3 cases were deemed to have partial hemostasis after 60 sec with OXY
- Logistic regression did not identify patient-related factors that predicted primary hemostasis (P > 0.05)

Conclusions

- Although specific predictors for primary pressure-based hemostasis were not identified, this study determined that a nasal solution of 0.05% OXY applied directly to the dental pulp effectively induced rapid secondary hemostasis prior to mineral trioxide aggregate (MTA) placement.
- Further clinical investigations are needed to establish the role of OXY as a pulpal hemostatic agent
- Additional reference: *Jones et al Children 2026*, <https://doi.org/10.3390/children13010028>

