



# Clinical and Radiographic Survival of Oxymetazoline Pulpotomies on Primary Molars

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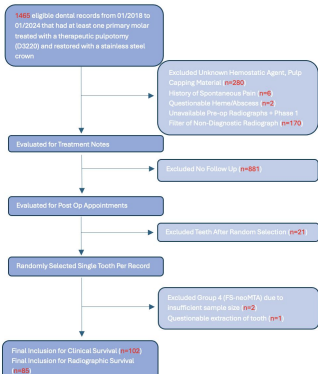
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## Introduction

Pulpotomies are a treatment option for vital primary teeth with reversible pulpitis or caries exposure. Currently, the most widely used secondary hemostasis agent following primary hemostasis via pressure, is ferric sulfate (FS). FS creates a Fe-protein complex that plugs damaged blood vessels. Unfortunately, FS when not rinsed well after application, has the potential to cause internal root resorption. The search for less caustic alternatives continue, one being **oxymetazoline**, often found in over-the-counter (OTC) nasal sprays. Afrin (NS-OXY) has an active alpha-agonist ingredient that performs temporary vasoconstriction of blood vessels and may provide secondary hemostasis in primary teeth.

## Materials and Methods

- IRB approval to review CDT codes for pulpotomy (D3220) treatment from 2018 to 2024 at University of Minnesota
- All treatment performed by graduate pediatric dental residents supervised by pediatric dentist
- Radiographs and clinical data were reviewed for survival
- Inclusion Criteria:
  - Vital primary molar with pulpotomy
  - Final restoration with stainless steel crown
  - Clinical note documenting use of pulpotomy materials (NS-OXY, FS, IRM and/or neoMTA)
- Exclusion Criteria:
  - No follow up after pulp treatment
  - Clinical signs of non-vitality including pre-op spontaneous pain, pain to percussion, or pathological mobility
  - Pre-op pathological radiographic findings
  - Non-diagnostic radiographs (Diagnostic radiographs were defined as those with about 3 mm of furcation visible)
  - Unable to reach hemostasis during procedure



## Results

Total of 102 and 85 teeth were included for clinical and radiographic survival, respectively.

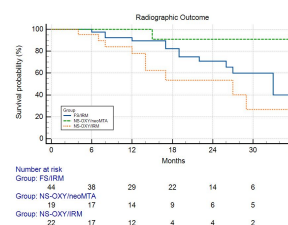
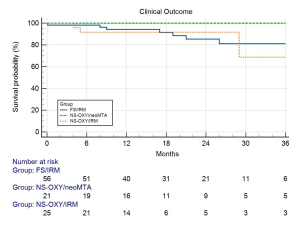


Table 5. Descriptive statistics of endiographic failure

Group	FS-IRM (Group 1)	NS-OXY-neoMTA (Group 2)	NS-OXY-IRM (Group 3)	Total
IRR w/o perforation	7	2	6	15 (17.64%)
IRR w/ perforation	1	0	1	2 (2.35%)
Furcal Radiolucency	8	1	5	14 (16.47%)
Total	16 (36.36%)	3 (15.78%)	12 (54.54%)	

IRR = Internal Root Resorption, w/o = without, w/ = with  
Total: N = # of radiographic failures by group / total radiographic cases in each group \*100  
Total: N = (total # of type of failure / total radiographic cases) \*100  
Total Radiographic cases: Group 1 (n=44), Group 2 (n=38), Group 3 (n=22)

Table 1. Clinical survival assessed with Restricted Mean Survival Time at 36 months. Note: There were no clinical failures from NS-OXY-neoMTA

Group	Mean	SE	95% CI for the mean
FS-IRM	32.336	1.222	29.941 to 34.732
NS-OXY-neoMTA	36.000	0.000	36.000 to 36.000
NS-OXY-IRM	31.771	2.024	27.804 to 35.737
Overall	32.921	0.869	31.217 to 34.625

Table 2. Clinical Survival assessment with Restricted Mean Survival (RMS) at 36 months demonstrates survival of NS-OXY-neoMTA to be significant compared to FS-IRM and NS-OXY-IRM

Group	FS-IRM	NS-OXY-neoMTA	NS-OXY-IRM
FS-IRM	-	3.6636 1.2685 to 6.0587 P=0.0027	-0.5656 -5.1992 to 4.0680 P=0.8109
NS-OXY-neoMTA	-4.6636 -6.0587 to -1.2685 P=0.0027	-	-4.2292 -8.1987 to -0.2626 P=0.0366
NS-OXY-IRM	-0.5656 -4.0680 to 3.1992 P=0.8109	4.2292 0.2626 to 8.1987 P=0.0366	-

Table 3. Radiographic survival assessed with Restricted Mean Survival Time at 36 months.

Group	Mean	SE	95% CI for the mean
FS-IRM	28.306	1.496	25.367 to 31.233
NS-OXY-neoMTA	34.091	1.560	31.033 to 37.149
NS-OXY-IRM	22.574	2.609	17.481 to 27.688
Overall	28.173	1.154	25.911 to 30.436

Table 4. Radiographic Survival assessment with Restricted Mean Survival (RMS) at 36 months demonstrates survival of NS-OXY-neoMTA to be significant compared to FS-IRM and NS-OXY-IRM

Group	FS-IRM	NS-OXY-neoMTA	NS-OXY-IRM
FS-IRM	-	5.7905 1.5334 to 10.0277 P=0.0074	-6.7261 -11.6210 to 0.1688 P=0.0569
NS-OXY-neoMTA	-5.7905 -10.0277 to -1.5334 P=0.0074	-	-11.5166 -17.4748 to -5.5585 P=0.0002
NS-OXY-IRM	-6.7261 -11.6210 to 0.1688 P=0.0569	11.5166 5.5585 to 17.4748 P=0.0002	-

- Clinical restricted mean survival time (RMS) at 36 months demonstrated that NS-OXY-neoMTA had a significant survival compared to both groups.
  - NS-OXY-neoMTA > FS-IRM P=0.0027
  - NS-OXY-neoMTA > NS-OXY-IRM P=0.0366
- There were no cases of clinical failure in NS-OXY-neoMTA in the RMS of 36 months.
- Radiographic RMS at 36 months demonstrated that NS-OXY-neoMTA had a significant survival compared to both groups.
  - NS-OXY-neoMTA > FS-IRM P=0.0074
  - NS-OXY-neoMTA > NS-OXY-IRM P=0.0002
- Within our study, 36.36% of FS-IRM pulpotomies and 54.54% of NS-OXY-IRM pulpotomies had radiographic failure, compared to NS-OXY-neoMTA which had a reduce percentage of 15.78%.

## Conclusions

- The choice of secondary hemostatic agents, NS-OXY and FS, did not predict radiographic or clinical outcomes
- With a Restricted Mean Survival of 36 months, NS-OXY-neoMTA had a clinically and radiographically significant survival to FS-IRM (P=0.0027 and P=0.0074) and NS-OXY-IRM (P=0.0366 and P=0.0002), respectively.
- Further analysis into NS-OXY and it's possible contribution for therapeutic pulpotomies in pediatric dentistry is warranted.



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