An Evaluation of Pulpectomies Utilizing Vitapex® root canal filling material in Primary Anteriors and Molars: A Retrospective Study

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Pulpectomies have been performed since the 1800’s.

Sweet 1930: “the management of *pulpless* deciduous teeth is no longer experimental. They respond so promptly to treatment that there is no shadow of a doubt as to the advisability of retaining them”

Gerlach 1932: Utilized Beechwood Creosote and iodine with *Gutta percha*.
Iodoform Pastes

- Walkoff paste (same as KRI paste), 1928
- Kri paste: 2.02% parachlorophenol, 4.86% Camphor, 1.22% menthol, 80.8% iodoform.
- Maistro paste: same components of KRI with addition of zinc oxide, thymol and lanolin
- Vitapex®: Iodoform 40.4%, calcium hydroxide 30.3%, and silicone oil 22.4%
- Endoflas: same as Vitapex® + ZOE
Recent Products

○ Metapex-Calcium Hydroxide and Iodoform
○ RC Fill-Zinc Oxide Eugenol and Iodoform
○ Endoflas-Zinc Oxide Eugenol, Calcium Hydroxide and Iodoform


Studied 96 molars with radiolucency and no mobility in 77 children for 9 months.

Results: Clinical success rate in GROUP I was 100%. Radiographic success rate in GROUP I was 81.1%. Clinical success rate in GROUP II was 96.8%. Radiographic success rate in GROUP II was 72.5%. Clinical success rate in GROUP III was 100%. Radiographic success rate in GROUP III was 90.32%
New products

Studied 96 molars with radiolucency and no mobility in 77 children for 9 months.

Results: Clinical success rate in RC Fill was 100%.
Radiographic success rate in RC Fill was 81.1%.
Clinical success rate in Metapex was 96.8%.
Radiographic success rate in Metapex was 72.5%
Clinical success rate in Endoflas was 100%
Radiographic success rate in Endoflas was 90.32%

**No statistically significant differences between the groups.**
Vitapex®

- Vitapex® is produced in Japan.
- Comes with a dispensing syringe with adaptable plastic tips for placement.
- One study completed in the US by Nurko et al.
- Two translated from Japanese studies: Fuchino et al. and Hideki et al.
Concerns....

- What if you extrude the apex?
- What happens after it resorbs?
  
  (Nurko et al)

- Where does it go??

- Primary tooth root morphology.

- Why is it effective?
  
  (Tchaou et. al /c 21 organisms.)

  Effective against black pigmented anaerobes (prevotella, porphyromonas, an Bacteriodes).
Canal Structure of Primary Teeth
<table>
<thead>
<tr>
<th>Investigator</th>
<th>Year</th>
<th>Follow-up (months)</th>
<th>Number of Teeth Examined</th>
<th>Filling Material</th>
<th>Success Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rabinowitch *56}</td>
<td>1953</td>
<td>N/A</td>
<td>1363</td>
<td>Black ZOE</td>
<td>99.5% (calculated)</td>
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<tr>
<td>Gould *36}</td>
<td>1972</td>
<td>7-26</td>
<td>29</td>
<td>ZOE</td>
<td>82.9% (calculated)</td>
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<tr>
<td>Fuchino T. et al. *57}</td>
<td>1978</td>
<td>1-19</td>
<td>130</td>
<td>Vitapex®</td>
<td>86.2-97.7%</td>
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<tr>
<td>Rifkin *58}</td>
<td>1980</td>
<td>12</td>
<td>26</td>
<td>KRI</td>
<td>89.0%</td>
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<tr>
<td>Hideki C et al. *59}</td>
<td>1981</td>
<td>24-54</td>
<td>183</td>
<td>Vitapex®</td>
<td>93.5%</td>
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<tr>
<td>Coll et al. *41}</td>
<td>1985</td>
<td>6-36</td>
<td>33</td>
<td>ZOE</td>
<td>80.5%</td>
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<td>Coll et al. *41}</td>
<td>1985</td>
<td>60-82</td>
<td>29</td>
<td>ZOE</td>
<td>86.1%</td>
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<tr>
<td>Study</td>
<td>Year</td>
<td>Duration</td>
<td>Sample Size</td>
<td>Treatment</td>
<td>Success Rate</td>
</tr>
<tr>
<td>------------------------</td>
<td>------</td>
<td>----------</td>
<td>-------------</td>
<td>-----------</td>
<td>--------------</td>
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<tr>
<td>Garcia-Godoy et al.</td>
<td>1987</td>
<td>6-24</td>
<td>55</td>
<td>KRI</td>
<td>95.6%</td>
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<tr>
<td>Reyes et al.</td>
<td>1989</td>
<td>6-24</td>
<td>53</td>
<td>KRI + FC + Ca(OH)2</td>
<td>100.0%</td>
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<tr>
<td>Barr et al.</td>
<td>1991</td>
<td>12-74</td>
<td>62</td>
<td>ZOE + FC</td>
<td>82.3%</td>
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<tr>
<td>Holan et al.</td>
<td>1993</td>
<td>6-48</td>
<td>34</td>
<td>ZOE</td>
<td>65%</td>
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<tr>
<td>Holan et al.</td>
<td>1993</td>
<td>6-48</td>
<td>44</td>
<td>KRI</td>
<td>84%</td>
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<tr>
<td>Coll et al.</td>
<td>1996</td>
<td>20-177</td>
<td>81</td>
<td>ZOE</td>
<td>77.8%</td>
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<tr>
<td>Nurko et al.</td>
<td>1999</td>
<td>3-22</td>
<td>33</td>
<td>Vitapex®</td>
<td>100%</td>
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<tr>
<td>Fuks et al.</td>
<td>2002</td>
<td>6-52</td>
<td>55</td>
<td>Endoflas</td>
<td>70%</td>
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</table>
## Retrospective Studies-pulpotomy

<table>
<thead>
<tr>
<th>Follow-up</th>
<th>Clinical Success</th>
<th>Radiographic Success</th>
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<tbody>
<tr>
<td></td>
<td>Ferric Sulfate</td>
<td>Formocresol</td>
</tr>
<tr>
<td></td>
<td>Period</td>
<td>n</td>
</tr>
<tr>
<td>Burnett &amp; Walker</td>
<td>1-&gt;36m</td>
<td>357</td>
</tr>
</tbody>
</table>

- Burnett & Walker
  - Statistically more failures with ferric sulfate than formocresol
  - At > 36 months formocresol had significantly less failures than ferric sulfate.
  - Radiographic sample size was very small especially at >36 m
  - Interradicular radiolucenies were the most common finding for both ferric sulfate and formocresol treated teeth
Nurko et al: 1999

a. Followed 33 teeth for 3 to 22 months treated with Vitapex®

b. Teeth had evidence of infection including

   mobility, purulence, and radiographic radiolucency.

c. Preoperative radiolucency must show a reduction in size or bone regeneration. No signs or symptoms of infection at 6 mo. recall.

d. 100% success rate.

e. Vitapex® that extruded apex resorbed within 2 months.
Resorption of Vitapex®
No damage to permanent tooth
All in the family
Pulpectomy procedures

- Diagnosis, Diagnosis, Diagnosis!!
  Considerations: medical status, characteristics of pain, radiographic findings, presence/absence of permanent successor, which tooth?, expected time to eruption of permanent successor.

- Pulpotomy vs. Pulpectomy?
  - vitality tests? Percussion? Thermal Stimulus? EPT?

- Be Prepared!!

- Take a PA to determine working length and Access

- Debridement
  - Coronal pulp chamber-round burs and spoon excavators
  - Barbed broaches and #10 files to remove organic material from canals.
  - Sodium Hypochlorite (FULL STRENGTH)
What now??
Pulpectomy Procedures

- Filing
- Filling
  a. Dry canals completely...bleeding should be subsided.
  b. Cut Vitapex tip as appropriate.
  c. Depress plunger and allow vitapex to force the syringe out.
  d. Leave a small layer over furcation.
  e. Seal with IRM or Temrex.
- PLACE AN SSC!!
Things you should just not do......
Things you should just not do....

- Filing toward the furcation area.
- Removing tooth structure and pulpal tissue *within* the canal with a round bur
- Performing a pulpotomy without hemostasis (proceed to pulpectomy)
- Inserting larger files into canals
- Extruding the apex with files
Vitapex Placement
Resolution of lesion with bone regeneration in 8 months.
Cases

Crown removed, and tooth treated with vitapex®.
Cases

10/07/99

03/23/01
Cases

05/02/00

08/24/01

02/28/02
Cases-marginally restorable
Previously pulpotomy treated tooth, retreated with vitapex pulpectomy.
Pathologic Resorption

Tooth remained long enough for #19 to erupt.
Results
Results

Overall survival success

- Follow-up Range .05 to 4.9 years (mean 1.7)
- All teeth = 85.5% (21/145)
- Teeth without initial radiolucency:
  94.81% (4/77)
- Teeth with an initial radiolucency:
  75.44% (14/57)
Results

- Significant Factors in the Analysis:
  - Presence of Radiolucency \( (p=0.012) \)
  - Treatment Location \( (p=0.013) \)
  - Restoration Type \( (p=0.003) \)
  - Provider Type \( (p=0.027) \)
## Results

### Significant Factors:

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>WALD CHI</th>
<th>df*</th>
<th>P-VALUE</th>
<th>HR</th>
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<tr>
<td>Restoration</td>
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<td>1</td>
<td>.003</td>
<td>4.335</td>
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<tr>
<td>SSC Reference</td>
<td>4.887</td>
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<td>.027</td>
<td>2.704</td>
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<tr>
<td>Provider General DDS</td>
<td>4.887</td>
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<td>.027</td>
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<tr>
<td>Type Pediatric DDS</td>
<td>Reference</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Alaska Native Arts and Crafts
Pulpotomy Comparison

Pulpotomy studies reporting with survival

Analysis:

Rolling et al.- 3-year survival analysis of fc pulpotomies:
1-year 83% (91%), 2-year 78% (88%), 3-year 70% (74%)

Smith et al.- 2-year 79% (88%), 3-year 60-65% (74%)

Casas et al.- 2-year 86% (88%), 30 mo. 25-50% (74%)
Other Considerations

- Should be attempted on 2nd primary molars to avoid space loss and distal shoe.
- Consider in cases of missing permanent successors.
- Consider utilizing apex locator to establish working length.
Cases

Right side treated with pulpectomy, left side treated with extraction.....
Conclusions
CONCLUSIONS

1. The overall success rate of teeth treated with a vitapex pulpectomy was 85.5% with a mean follow-up period of 1.7 years (range .5 to 4.9 years).

2. The overall success rate of teeth treated that had no initial radiolucency was 94.8%.

3. The overall success rate of teeth treated with an initial radiolucency was 75.4%.
Questions?