Vital Pulp Therapy for the Primary Dentition

Indirect Pulp Treatment vs. Pulpotomy

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Vital Pulp Therapy\textsuperscript{1} in the primary dentition

- No pulpitis
- Healthy tooth with trauma
- Reversible pulpitis - exhibiting provoked pain of short duration, that is relieved upon the removal of stimulus, with analgesics or by brushing
- Pulp is judged by clinical and radiographic criteria to be vital and able to heal from the carious or traumatic insult
Non-Vital Pulp Therapy in the primary dentition

- Hx of spontaneous, unprovoked pain
- Sinus tract
- Periodontal inflammation not resulting from gingivitis or periodontitis
- Excessive mobility not associated with trauma or exfoliation
- Furcation/apical radiolucency
- Radiographic evidence of internal/external resorption
Indirect Pulp Treatment

• Tooth with deep carious lesion adjacent to the pulp
• Caries near the pulp is left to avoid pulp exposure
• Caries covered with a biocompatible material
• Calcium hydroxide, zinc oxide and eugenol, or glass ionomer cement is placed over the remaining affected dentin to stimulate healing and repair
• Tooth restored with a material that seals the tooth from microleakage
Indirect Pulp Treatment
Pulpotomy\(^1\)

- Tooth with a deep carious lesion adjacent to the pulp
- Caries removal results in pulp exposure
- Coronal pulp is amputated
- Remaining vital radicular pulp tissue surface treated with a medicament (formocresol, ferric sulfate, MTA or cauterized with electrosurgery or laser)
- Coronal pulp chamber is filled with a suitable base
- Tooth is restored with a restoration that seals the tooth from microleakage
What’s Being Taught and being Used in Pediatric Programs in US Dental Schools & by ABPD Diplomates?
## Survey Results Regarding Teaching and Use of Indirect Pulp Therapy (IPT) in Primary Teeth

<table>
<thead>
<tr>
<th></th>
<th>Directors 1997</th>
<th>Directors 2005</th>
<th>ABPD Diplomates 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teach or use IPT</strong></td>
<td>37/53 (70%)</td>
<td>40/48 (83%)</td>
<td>486/689 (71%)</td>
</tr>
<tr>
<td><strong>IPT Liner</strong></td>
<td>Ca(OH)₂: 33/37 (89%)</td>
<td>Ca(OH)₂: 26/56 (47%)</td>
<td>Ca(OH)₂: 323/644 (50%)</td>
</tr>
<tr>
<td></td>
<td>ZOE: 8/37 (22%)</td>
<td>ZOE: 4/56 (7%)</td>
<td>ZOE: 50/644 (8%)</td>
</tr>
<tr>
<td></td>
<td>GI: 6/47 (13%)</td>
<td>GI: 26/56 (47%)</td>
<td>GI: 271/644 (42%)</td>
</tr>
<tr>
<td><strong>Don’t re-enter IPT</strong></td>
<td>21/37 (57%)</td>
<td>40/45 (89%)</td>
<td>472/559 (84%)</td>
</tr>
</tbody>
</table>
Survey Results Regarding Teaching and Use of Pulpotomy in Primary Teeth

<table>
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<tr>
<th>Teach or Use Pulpotomy</th>
<th>Directors in 1997</th>
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<th>ABPD Diplomates in 2005</th>
</tr>
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<tr>
<td><strong>53/53 (100%)</strong></td>
<td><strong>48/48 (100%)</strong></td>
<td><strong>681/689 (99%)</strong></td>
<td></td>
</tr>
</tbody>
</table>

| Pulpotomy Medicants    | 1:5 Formo: 38/53 (72%) 100% Formo: 12/53 (22%) Ferric sulfate: 2/53 (4%) Other: 1/53 (2%) | 1:5 Formo: 29/54 (54%) 100% Formo: 12/54 (22%) Ferric sulfate: 13/54 (24%) Other: 0 | 1:5 Formo: 345/702 (49%) 100% Formo: 223/702 (32%) Ferric sulfate: 125/702 (18%) Other: 9/702 (1%) |
## Success Rates - Indirect Pulp Treatment

<table>
<thead>
<tr>
<th>Reference</th>
<th>IPT Material</th>
<th>Success (%)</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buyukgural et al 2008</td>
<td>Various</td>
<td>100%</td>
<td>24 mo</td>
</tr>
<tr>
<td>Maltz et al 2007</td>
<td>Ca(OH)2 (dycal)</td>
<td>88%</td>
<td>36-45 mo</td>
</tr>
<tr>
<td>Vij et al 2004</td>
<td>GIC</td>
<td>94%</td>
<td>36 mo</td>
</tr>
<tr>
<td>Al-Zayer et al 2003</td>
<td>Ca(OH)2 (dycal)</td>
<td>95%</td>
<td>2 wks - 73 mo</td>
</tr>
<tr>
<td>Falster et al 2002</td>
<td>Various</td>
<td>90%</td>
<td>24 mo</td>
</tr>
<tr>
<td>Farooq et al. 2000</td>
<td>GIC</td>
<td>93%</td>
<td>24-90 mo</td>
</tr>
</tbody>
</table>
## Success Rates - Pulpotomy

<table>
<thead>
<tr>
<th>References</th>
<th>Pulpotomy Type</th>
<th>Success (%)</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holan et al 2005&lt;sup&gt;9&lt;/sup&gt;</td>
<td>MTA</td>
<td>91%</td>
<td>38 mo</td>
</tr>
<tr>
<td>Vij et al 2004&lt;sup&gt;5&lt;/sup&gt;</td>
<td>100% Formocresol</td>
<td>70%</td>
<td>36 mo</td>
</tr>
<tr>
<td>Casas et al 2004&lt;sup&gt;10&lt;/sup&gt;</td>
<td>Ferric Sulfate</td>
<td>67%</td>
<td>36 mo</td>
</tr>
<tr>
<td>Eidelman et al 2001&lt;sup&gt;11&lt;/sup&gt;</td>
<td>MTA</td>
<td>100%</td>
<td>13 mo</td>
</tr>
<tr>
<td>Farooq et al 2000&lt;sup&gt;8&lt;/sup&gt;</td>
<td>100% Formocresol</td>
<td>74%</td>
<td>24-84 mo</td>
</tr>
<tr>
<td>Smith et al 2000&lt;sup&gt;12&lt;/sup&gt;</td>
<td>Ferric Sulfate</td>
<td>74-80%</td>
<td>19 mo</td>
</tr>
<tr>
<td>Gruythuysen et al 1997&lt;sup&gt;13&lt;/sup&gt;</td>
<td>Ca(OH)2</td>
<td>80%</td>
<td>24 mo</td>
</tr>
<tr>
<td>Fuks et al 1997&lt;sup&gt;14&lt;/sup&gt;</td>
<td>1:5 Formo/FeS</td>
<td>84% Formo, 93%FeS</td>
<td>6 mo</td>
</tr>
</tbody>
</table>
Caries Control and Other Variables Associated With Success of Primary Molar Vital Pulp Therapy
Vij R, Coll J, Shelton P, Farooq N.
Pediatric Dentistry 2003; 26(3) 214-220.

• **Methods**: Restrospective chart audits on 226 primary molars with deep caries treated with IPT and FP

• **Results**:
  – IPT was successful 94% of the time, whereas FP was successful 70% of the time
  – Primary molar FP success on primary 1st molars was 61% vs 83% in the 2nd molars
  – IPT was successful 92% of the time for 1st molars vs 98% of the time for 2nd molars
  – 36% of FP treated teeth exfoliated early vs 2% of IPT treated teeth
  – Type of final restoration did not affect IPT or FP success
Success rates of formocresol pulpotomy and indirect pulp therapy in the treatment of deep dentinal caries in the primary teeth


- **Methods:** 133 primary molars with deep caries approaching the pulp were treated with FP or IPT and followed 2-7 years.

- **Results:**
  - Overall IPT success was 93% vs 74% for FP
  - FP treated molars exhibited earlier exfoliation 38%, while all IPT molars exhibited normal exfoliation
  - Molars with pain compatible with a diagnosis of reversible pulpitis were successfully treated by IPT 85% vs 76% for FP
What are dentists doing?

- 70% of surveyed program directors and 80% of surveyed pediatric dentists reported that a pulpotomy is the treatment of choice over IPT²
And…

• When given a scenario for a tooth that had the indications for IPT, according to the AAPD guidelines, only 30% of directors and 19% of the diplomates performed an IPT²
What Research Shows

- IPT has been shown to have a lower cost, higher success long-term, better exfoliation pattern, and a better success treating reversible pulpitis than pulpotomy.

- At a symposium with pediatric dentists and endodontists, more than half stated they would stop caries excavation and perform an IPT rather than a pulpotomy, and 75% agree that there is evidence that IPT is as successful as pulpotomy in primary teeth.
Indirect Pulp Therapy

Pre-op
10/8/07

Post-op
03/25/09

16 months

#L
Indirect Pulp Treatment

#S & #T

Pre-op

Immediate

Post-op

6 months

12 months

18 months

24 months
Indirect Pulp Treatment #K

Immediate

Pre-op

Post-op

6 months

12 months

18 months

24 months
Questions?
References


References


References

