Comparison of Pulpotomy and Direct Pulp Capping with MTA in carious primary molars.

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Background

- **Pulpotomy:**
  - When complete removal of caries leads to exposure of vital/with signs of early inflammation pulp
  - In cases of iatrogenic / traumatic exposure

- **Direct Pulp Capping:**
  - Pinpoint exposure due to iatrogenic accident / in trauma cases
  - 1-2 years to expoliation
  - C level of evidence

Success Rates

- **98-100%**
- **68-100%**

Background

Comparison of different pulpotomy materials:
- MTA > FC, CH, FS

Comparison of materials used as direct pulp capping agents
- No evidence of superiority of one material over the other (more studies are needed)

Smail-Faugeron et al, 2014

There is no RCT on comparing DPC and pulpotomy with MTA in primary dentition
Aim of the Study

• Comparison of clinical and radiographic success of
  ▫ Pulpotomy
  ▫ Direct Pulp Capping
  with MTA in primary molars

• Follow up for 6 months and 1 year
Study Design

• Study Sample: 90 teeth
• Healthy (ASA I, II), cooperative patients, aged 3-9
• Signed parental consent form
• Randomization (per person)
• Post grad students (trained and calibrated)
• Groups
  ▫ Control Group: Pulpotomy
  ▫ Intervention Group: Direct Pulp Capping
• Clinical and radiographic examination every 6 months for 3 years
## Inclusion Criteria

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Radiographic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restorable teeth</td>
<td>None or 1/3 normal root resorption</td>
</tr>
<tr>
<td>No history of pain</td>
<td>No periapical tooth pathosis</td>
</tr>
<tr>
<td>Bleeding pulp exposure</td>
<td>D4 carious lesion</td>
</tr>
<tr>
<td>Bleeding stops after max 5 min</td>
<td></td>
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</tbody>
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Restorable teeth suitable for vital pulp therapy
Materials and Methods - Protocol

1. Local anesthesia
2. Rubber dam
3. Complete caries removal → pulp exposure

**Pulpotomy (P/my)**
- Removal of pulp
- Haemostasis with cotton pellets for max 5 min
- MTA (Medcem GmbH) paste over pulp
- RMGIC (Vitrebond, 3M) over MTA

**Direct pulp capping (DPC)**
- Haemostasis on the pulp exposure site for max 5 min
- MTA (Medcem GmbH) paste over exposure
- RMGIC (Vitrebond, 3M) over MTA

**Class I** – Composite Resin restoration
**Class II** – Stainless Steel Crown
### Follow-up

Every 6 months

<table>
<thead>
<tr>
<th>Clinical Criteria</th>
<th>Radiographic Criteria</th>
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</thead>
<tbody>
<tr>
<td>• Pain (automatic, percussion, palpation)</td>
<td>• Loss of lamina dura</td>
</tr>
<tr>
<td>• Mobility (pathologic)</td>
<td>• Radiolucency of the furcation area</td>
</tr>
<tr>
<td>• Restoration presence</td>
<td>• Pathologic external resorption</td>
</tr>
<tr>
<td>• Contact point</td>
<td>• Internal resorption</td>
</tr>
<tr>
<td>• Secondary caries</td>
<td>• Pulp canal obliteration (not evaluated as failure)</td>
</tr>
<tr>
<td>• Occlusion</td>
<td></td>
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<tr>
<td>• Periodontal health</td>
<td></td>
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</table>
# Results

<table>
<thead>
<tr>
<th>Type of Cavity (Mesial/Distal/Occlusal)</th>
<th>P/my</th>
<th>DPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age (SD) months</td>
<td>74.9 (17.1)</td>
<td>81.5 (14.9)</td>
</tr>
<tr>
<td>30 teeth were excluded after Randomization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>76 patients - 97 teeth</td>
<td>57 teeth</td>
<td>40 teeth</td>
</tr>
</tbody>
</table>
Results – Success Rates

Clinical Success

- 6 months: 100\% pulpotomy, 96\% direct pulp capping
- 1 year: 94\% pulpotomy, 86\% direct pulp capping

Radiographic Success

- 6 months: 97\% pulpotomy, 73\% direct pulp capping
- 1 year: 89\% pulpotomy, 72\% direct pulp capping

NOT statistically significant
Radiographic findings - 1 year

- lamina dura loss
- internal root resorption
- external root resorption
- normal resorption
- pulp canal obliteration
- furcation radiolucency

*p=0.042
Results

- Failure, of any kind, is not correlated with age.

- The possibility of direct pulp capping to clinically fail in comparison with pulpotomy through time is statistically significant (OR:11.95, p=0.029).

- The possibility of late appearance of failures of pulpotomy (OR:10.95, p=0.010) is greater than the rate of failure of direct pulp capping (OR:2.35, p=0.028).
Results

- Occlusal surface exposures did not fail at 1 year follow-up regardless the pulp therapy.

- Independently of type of therapy, distal cavities were less likely to fail in comparison with mesial (p=0.06).

- Both for distal and mesial exposures, direct pulp capping was more likely to fail than pulpotomy (not significant).
Conclusions

• Direct pulp capping with MTA shows lower success rates than pulpotomy with MTA, but this result is not statistically significant for 6 months or 1 year follow-up.

• However, the possibility of direct pulp capping failing through time in comparison to pulpotomy is statistically significant.

• Even though more studies are needed, direct pulp capping with MTA should not be disregarded as a possible alternative to pulpotomy in carefully selected patients.
Thank you!
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