Oral Health Promotion Research Group Bursary 2016

Sponsored by the Dental Health Foundation
Fluoride varnish efficacy in preventing dental caries in high risk children following treatment under dental general anaesthesia: a prospective study

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Rationale

• Oral Health is a basic human right, an integral element of health and well being. *(Watt R, 2005)*

• Caries is an entirely preventable disease affecting 60-90% of school-children. *(WHO, 2012)*

• Caries is the single most common chronic disease of childhood
  – five times more common than asthma
  – seven times more common than hay-fever. *(U.S Dept. of Health and Human Services, 2003)*
Oral Health of Children in Ireland

Percentage of children with caries in the Republic of Ireland (RoI) 2002 by fluoridation status and in the UK 2003 (Whelton et al., 2006)

<table>
<thead>
<tr>
<th>Age 5</th>
<th>Age 8</th>
<th>Age 12</th>
<th>Age 15</th>
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<tbody>
<tr>
<td>RoI F</td>
<td>RoI NF</td>
<td>UK</td>
<td></td>
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<td>37</td>
<td>43</td>
<td>55</td>
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<td>21</td>
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<td>43</td>
<td>57</td>
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<td>79</td>
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Schools Dental Service

- No pre-school screening/prevention for those under 5 *(IOHSGI, 2009)*
- One in four 3-year-olds (27.4%) experienced dental caries. *(Tuohy et al., 2000)*
- Must seek treatment privately or attend HSE clinics complaining of pain/sepsis
- Only 19% of 5-year-olds and 22% of 8-year-olds normally attend for private treatment *(Whelton et al., 2006)*
Dental General Anaesthesia (DGA)

- Necessary component of dental public health service - not without risk

- Evidence has shown the most common reason for the administration of DGA in young children is treatment of dental caries (90.8%). *(Albadri et al., 2006)*

- Demand from both high and low SES Groups. *(Madan et al., 2010)*
Pre-school children undergoing DGA at Cork University Hospital

• Primary indication for treatment due to dental caries
• More children attending disadvantaged schools required DGA with neither medical history nor fluoride status having any significant effect.
• Poor oral health into adolescence
  – High levels of dental caries in 1\textsuperscript{st}/3\textsuperscript{rd}/6\textsuperscript{th} class
  – Further extractions, restorations and repeat DGA
Post DGA at CUH

- 80% of patients did not receive a recall appointment
- Nature of treatment in first post DGA visit noted
  - 10% of subjects referred for DGA2
  - 15% placed on Ab or underwent xla
Cost of Dental General Anaesthesia (DGA)

- Economic climate dictates scarce resources be used efficiently and effectively
- Current service in Ireland is not achieving Value For Money. *(Deloitte & Touche, 2001)*
- Reported DGA costs vary:
  - USA: $2,581. *(Bruen et al., 2016)*
  - Australia: £840-2000/child. *(Kanellis et al., 2000)*
- Canadian hospitals estimate $10.5 million dollars is spent on DGA annually *(Association of Dental Surgeons of British Columbia, 2001)*
Day service in CUH treating 10 patients/day
Dental Extractions only
Distinct separate entity from special needs service

€818.97 per child

> €8,000 per day
# Average Cost of DGA in Cork University Hospital

<table>
<thead>
<tr>
<th>DIRECT AND INDIRECT COSTS FOR DGA</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1. Annual Total Allocated Theatre Costs</td>
<td>€1,266,381.09</td>
</tr>
<tr>
<td>2. Annual third party cleaning</td>
<td>€15,246.00</td>
</tr>
<tr>
<td>3. Annual theatre consumables</td>
<td>€229,550.67</td>
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<tr>
<td>4. Annual waste management</td>
<td>€38,633.85</td>
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<tr>
<td>5. Annual theatre maintenance</td>
<td>€20,000.00</td>
</tr>
<tr>
<td>6. Total Annual Theatre Operating Costs (1+2+3+4+5)</td>
<td>€1,592,888.86</td>
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<tr>
<td>7. Cost per patient</td>
<td>€689.96</td>
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<td>8. Patient loss</td>
<td>€129.41</td>
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<tr>
<td><strong>TOTAL COST:</strong></td>
<td></td>
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<tr>
<td>9. Total Number of Patients P/A</td>
<td>2,310</td>
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<tr>
<td>10. Total Cost per Patient (9/10)</td>
<td>€818.97</td>
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</tbody>
</table>

## OHPRG/DHF Bursary Winner 2016
Intervention V Treatment

- Question is not of one service or another but how much of what service should be provided
- Research indicates early parental education and timely intervention can lead to;
  - Improved health outcomes
  - Reduced costs “tens of millions of dollars”. *(Savage et al., 2004)*
Fluoride Varnish

Fluoride varnish application two or four times a year, either in the permanent or primary dentition, is associated with a substantial reduction in caries increment and has been shown to reduce caries in high risk children (Marinho et al., 2002)
Research Hypothesis

• High risk children require referral to an appropriate recall program following DGA
• Fluoride varnish is an effective means of reducing caries susceptibility in high risk patients
• Fluoride varnish is more effective than parental counselling alone
• The cost of a fluoride varnish based prevention program would require significantly less investment than DGA
Research Aim

Develop an evidence based protocol for a cost-effective prevention program aimed at reducing the caries susceptibility of high risk children who have had dental extractions under general anaesthesia in Ireland.
Methods

Ethical Approval

• Clinical Research Ethics Committee of the Cork Teaching Hospital
• Nationally recognized by the Department of Health and Children

HSE Permission

• Make available data relating to children aged 5 years and younger who have had extractions completed under DGA in CHO-4

Enterprise BRIDGES/SOEL Computing

• Dental Patient Management System in the HSE South since 1999
• 200,000 unique patients, 800,000 chartings, over 26 million charted conditions
Recruitment

- Patients satisfying the inclusion criteria will be invited to partake.
- Full parental consent
- Age/Gender/Referral clinic
- Medical history
  - Full medical history form will be completed as part of the recruitment and consent process
- Presence of a fluoridated domestic water supply.
  - To be discussed with parent and confirmed on fluoride map
- Socio economic status
  - Using medical card ownership as the indicator
- DGA experience including indicator for DGA, waiting period and number of teeth extracted
Intervention: Randomly assigned to 3 groups

Group 1
- No fluoride varnish
- Parental counselling provided

Group 2
- Fluoride varnish 3/12
- Parental counselling

Group 3
- Fluoride varnish 6/12
- Parental counselling
Outcome

• Dental examinations will be conducted three times:
  – Baseline
  – 6 months
  – One year following the intervention with longer follow up desired.

• The primary outcome measure is the presence of dental caries
Cost analysis

- Average cost of prevention scheme/child
- Cost effectiveness determination
- Cost comparison with DGA

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Conclusion

• Past caries experience is an indicator of future caries development (Almeida et al., 2000),

• Early preventive dental visits have the potential to improve oral health outcomes and reduce cost (American Academy of Pediatric Dentistry, 2013)

• The development of an evidence based protocol for recalling high risk patients into preventive services may:
  – Reduce caries levels
  – Improve oral health
  – Reduce associated costs
References


References


