Reports of recent clinical research that inform innovative approaches for the treatment of caries in high risk children

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Reports of recent clinical research that inform innovative approaches for the treatment of caries in high risk children

1. Hall Technique – innovative
   → what it is & how it works
   → what is the evidence for it?
   → how to do it

2. FiCTION Dental Trial

3. High risk – is there a caries threshold for restorative treatment success?
The Hall Technique – what it is and how it works

Recognition
of disease contributory factors & of the disease itself

Review
of the child, their oral health & their situation

Re-orientation
of contributory lifestyle factors

Repair
of lesions - where no other solution is possible

Remineralisation
of all lesions
- visible & not visible
- cavitated & non-cavitated

adapted and expanded from Walsh et al. 2013
Recognition of disease contributory factors & of the disease itself

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Repair of lesions where no other solution is possible

Review of the child, their oral health & their situation

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Remineralisation of all lesions - visible & not visible - cavitated & non-cavitated

Repair of lesions where no other solution is possible

Review of the child, their oral health & their situation
How do we halt the process?

Isolating a carious lesion from dietary sugars, oxygen
Makes the environment unfavourable

This disrupts the biofilm

Essentially we create a seal between the carious lesion and the oral environment – *we put a lid on the city*...
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The Hall Technique – what is the evidence for it?

Success rates (no pain or infection)
1 year - 99% (UK) & 100% (Germany)
2 years - 98% (UK) & 93% (Germany)
5 years - 97% (UK)
1. Al-Yaseen W et al. How deep is too deep? A retrospective study of the relationship between radiographic caries lesion depth and successful outcomes with the Hall Technique. IAPD. 2015; Glasgow UK.


Dental caries and the plaque biofilm

By placing a crown over the tooth, we isolate the carious lesion from the oral environment and change the ecology of the biofilm so drastically that the carious lesion simply cannot thrive and will ultimately arrest.

Repair: Managing carious lesion/ biofilm; 2 main approaches

1. Sealing in carious lesion
   a) The Hall Technique (crowns)
   b) Fissure sealants
   c) Selective caries removal & restorative material

2. Non-restorative cavity control
   ± Fluoride varnish/ Silver diamine fluoride
The Hall Technique – how to do it

The Hall Technique is a simple method for using metal crowns (SSCs) to manage carious primary molar teeth by seating a correctly sized crown over the tooth, and sealing the carious lesion in using a glass ionomer luting cement.

- Local anaesthesia is **not** required
- Tooth preparation is **not** carried out
- **No** carious tissue is removed
Have ready

- Mirror
- Probe or small excavator (to remove separators)
- Excavator (to remove crown if not fitting well during the procedure)
- Flat plastic (to fill crown with cement)
- Cotton wool rolls (to wipe away cement and for the child to bite down on to push crown on tooth)
- Gauze or Elastoplast (to protect the airway)
Separators

Remove separators after 5-7 days at crown fit appointment
Hall Technique procedure

Airway protection!
Hall Technique procedure

• Sit child upright
• Aim to fit the smallest size of crown which will seat

• **DO NOT ATTEMPT TO SEAT THE CROWN AT TRY-IN!**
Should cover all cusps with feeling of “spring back”
• Dry the crown  

• Fill with glass ionomer luting cement, ensuring the crown is well filled  

• Dry tooth if possible
• Place crown over tooth and **partially** seat crown

• Remove finger and encourage the child to “bite” into place

**OR**

• fully seat the crown with firm finger pressure alone
• Ask the child to open their mouth and clean excess cement **quickly!!**
  • Bad taste...
Once cement has been quickly cleaned **but is still soft**, ask the child to close their teeth together again...
• ...and bite firmly on the crown for 2 – 3 minutes

OR

• Hold the crown with firm finger pressure
  • prevents crowns from springing back and potentially reducing effective seal
• Reassure child and parent:

  • The crown is supposed to fit tightly and the gum will adjust

  • Child will get used to the feeling of the crown within 24 hours

  • The occlusion tends to adjust within a few weeks
Note blanching of the gingivae
Recognition of disease contributory factors & of the disease itself

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Remineralisation of all lesions - visible & not visible, cavitated & non-cavitated

Repair of lesions - where no other solutions is possible

For more info...

https://en.wikipedia.org/wiki/Hall_Technique

Or go to Wikipedia and search for Hall Technique
Use the Hall Technique if ...

• A full history and clinical examination including bitewing radiographs has been completed

• The tooth is asymptomatic (or reversible pulpitis)

• There must be a band of “normal” looking dentine visible between the pulp chamber and the cavity on the radiograph
Indications for the Hall Technique

- Proximal lesions (Class II), cavitated or non-cavitated
- Occlusal lesions (only if the child cannot tolerate other treatment)
Indications for the Hall Technique

There must be a band of “normal” looking dentine visible between the pulp chamber and the cavity on the radiograph.
Contra-indications for the Hall Technique

**Contra-indications**

- Irreversible pulpitis or abscess / infection
- Clinical or radiographic: caries has reached the pulp, pulp exposure or apical pathology
- Badly broken down teeth
- No clear band of “normal” looking dentine
- Teeth with arrested caries
- Child at risk of bacterial endocarditis or immunocompromised
Filling Children’s Teeth Indicated Or Not
Project Aim

What is the clinical and cost-effectiveness of 3 treatment strategies for managing dental caries in primary teeth over 3 years in a general dental practice setting?

**Primary outcome**
- Pain/infection related to caries

**Secondary outcomes**
- Quality of Life
- Caries incidence
- Cost effectiveness
- Treatment preferences
# Objectives

## Primary outcome

| Clinical | Pain and/or infection related to dental caries |

## Secondary outcomes

<table>
<thead>
<tr>
<th>Patient</th>
<th>Quality of Life</th>
<th>Decay incidence in $1^\circ$ &amp; $2^\circ$ teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics</td>
<td>Cost effectiveness</td>
<td></td>
</tr>
<tr>
<td>Patient/provider</td>
<td>Treatment preferences</td>
<td></td>
</tr>
</tbody>
</table>
Clinical Centres

- 60 months (from Jan 2012)
  - 1yr Recruitment period
  - 3yr Follow-up
- Practices across 5 Clinical Centres
  - Fluoridation, Ethnic diversity, Service funding
- Dentists and teams
- 1124 children randomised to 1 of 3 treatment arms
Conventional Management and Best Practice Prevention Arm

Conventional restorative methods

- The approach is based on active management of caries by its complete removal
  - Use of local anaesthetic
  - Caries is removed using rotary instruments or by hand excavation
  - Restoration placed using conventional methods (fillings).
Sealing caries into the tooth to separate it from the oral cavity. The change in the environment slows or stops the carious process.

- This treatment is generally carried out without rotary instruments or local anaesthetic
  - Fissure sealing over non-cavitated lesion
  - Applying an adhesive filling material in a cavity after selective caries removal
  - Covering it with a metal crown.
Preventive methods alone are used to remove the biofilm, remineralise and stop the progress of caries. Following UK guidelines.

- No drilling, filling, or sealing of primary teeth is used.
  - Toothbrushing
  - Diet advice
  - Topical fluoride varnish application to primary and permanent teeth
  - Fissure sealants for permanent teeth.
September 2012
FiCTION 2007 – 2017
(with results in 2018)
Flow Diagram of Main Trial

1. Invitation
2. Screening
3. Consent
4. Enrolment
5. Randomisation
6. Treatment according to allocated management arm
7. Subsequent follow-up with management over 3y
8. Final Study Visit
The Flow Diagram of Main Trial:

1. **Invitation**
2. **Screening**
3. **Consent**
4. **Enrolment**
5. **Randomisation**
6. **Treatment according to allocated management arm**
7. **Subsequent follow-up with management over 3y**
8. **Final Study Visit**

**Database closure**

**Data cleaning**

**Data analysis**

**Preliminary discussion of findings**

**Definitive data synthesis**

**Report to HTA**

**Approval (Dec ’17 ~ 6 months)**

**Publications & Implementation to policy, practice and teaching**

**Analysis**

- **Primary Outcomes:** Pain or Sepsis
  - Secondary Outcomes:
    - Caries in primary & permanent teeth
    - Quality of Life
    - Health economics
    - Patient/parent acceptability and reported experiences
    - Dentists' preferences

**Follow-up**

- Data collected at appointments (clinical measures & questionnaires):
  - Baseline
  - Scheduled/emergency
  - Final appointment

**Randomisation**

- **Conventional Management and Best Practice Prevention**
- **Biological Management and Best Practice Prevention**
- **Best Practice Prevention alone**

**Recall Oral Health Assessment appointment**

- Invited to participate: Meets inclusion criteria
- Invited to participate: Declined to participate
- Excluded: Did not meet criteria
- Excluded: Declined to participate

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Where are we now?
• examine and follow up 7–9 year-olds at 207 statefunded schools in NW of England
• February 2006 onwards
• comparatively high caries prevalence; no fluoridated water program

Figure 2. Distribution of $D_3MFT$ by $d_3mft$ caries status and clinical examination (CE). $D_3MFT$, number of decayed, missing, and filled teeth for permanent dentition; $d_3mft$, number of decayed, missing, and filled teeth for primary dentition.
Figure 3. Estimated mean D₃MFT for male, white, and Index of Material Deprivation quintile 5 (most deprived) subgroup by clinical examination I (CEI) d₃mft caries status. CI, confidence interval; D₃MFT, number of decayed, missing, and filled teeth for permanent dentition; d₃mft, number of decayed, missing, and filled teeth for primary dentition.

• Children who developed caries in their primary dentition had a very different caries trajectory in their permanent dentition compared to their caries-free contemporaries.

• Consider caries-free and caries-active children as 2 separate populations with different prevention strategies required.

• What are the implications for treatment though?
Henry

4 years old, no relevant medical history, no obvious anxiety, no pain or discomfort, mother can and will bring him for regular care and wants to prevent further problems.

Proposed treatment plan