

# A survey of paediatric caries management teaching within dental therapy programmes in the UK

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## In brief

Provides an overview of current teaching in relation to management of dental caries within dental therapy schools within the United Kingdom.

Highlights that conventional caries management techniques are currently being taught within undergraduate therapy programmes.

Shows that alternative caries management techniques are being taught including, no- or minimal caries removal, with the majority of schools teaching the Hall technique.

**Objective** To assess didactic and clinical skills teaching of conventional and alternative treatment techniques for the management of dental caries in paediatric dentistry in dental therapy schools across the UK. **Method** A structured online questionnaire was developed using SurveyMonkey. The survey link was emailed to all teaching leads for all 22 dental therapy schools throughout the UK. The survey was open online for three months. **Results** Data were obtained for 20 schools. Regarding didactic and skills teaching of conventional techniques, the majority of schools taught complete caries removal and plastic restoration. Additionally, most taught both pulpal therapy and pre-formed metal crown placement for the primary dentition. In relation to alternative techniques, favoured teaching options related to no or minimal caries removal with prevention or some form of sealant restoration, including for the primary dentition use of the Hall Technique. **Conclusions** Both conventional and alternative treatment techniques for the management of dental caries within paediatric dentistry appear to be taught within dental therapy programmes in the UK.

## Introduction

Currently, within the UK, there are 22 dental therapy schools. There appears to be a lack of detail concerning the teaching undertaken in paediatric dentistry for the management of dental caries for undergraduate students. Traditionally, teaching on the management of caries in the child/adolescent patient has included local anaesthetic administration, rubber dam application, complete caries removal using rotary instruments and some form of plastic restoration which has been advocated the British Society of Paediatric Dentistry.<sup>1,2</sup> More recently, however, there has been a move towards teaching of alternative treatment techniques given the acknowledgement that caries is primarily a biofilm-driven

disease. Such alternatives include innovative means of cavity preparation/excavation or non- or micro-invasive approaches which work by either sealing over the carious lesion or infiltrating the lesion with some form of resin.<sup>3-7</sup>

The aim of the present study was to determine the current teaching practices in relation to the management of dental caries within undergraduate dental therapy programmes within the UK.

## Materials and methods

A structured online questionnaire was developed using SurveyMonkey. The survey link was emailed to all teaching leads for all 22 dental therapy schools throughout the UK. A reminder email was sent four weeks after survey launch. The survey was open online for three months from December 2015 to February 2016.

Information was collected as follows:

1. University dental school affiliation
2. Didactic-and clinical skills teaching of

conventional treatment techniques for the primary and permanent dentitions:

- Rubber dam tooth isolation
- Fissure sealant/preventive resin restoration
- Single-surface restoration
- Multi-surface restoration
- Pre-formed metal crown placement (excluding the Hall Technique)
- Pulpal therapy (primary dentition)
- Extraction (primary dentition)
- Other techniques

3. Didactic and clinical skills teaching of alternative treatment techniques for the primary and permanent dentitions:

- Render the lesion self-cleansing
- No caries removal and prevention
- No caries removal and fissure sealant
- No caries removal and Hall technique
- Air abrasion
- Chemo-mechanical caries removal
- Laser
- Tunnel preparation
- Partial caries removal and restoration
- ICON resin infiltration.

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**Table 1 Didactic teaching of conventional treatment techniques for the management of caries in the primary and permanent dentitions**

	Primary dentition	Permanent dentition
Rubber dam application	17	20
Fissure sealant/preventive resin restoration	17	20
Single-surface restoration	19	19
Multi-surface restoration	18	19
Pre-formed metal crown (excluding Hall)	17	4
Pulpotomy	18	N/A
Extraction	19	N/A

**Table 2 Clinical skills teaching of conventional treatment techniques for the management of caries in the primary and permanent dentitions**

	Primary dentition	Permanent dentition
No skills programme	1	1
Rubber dam application	15	19
Fissure sealant/preventive resin restoration	17	19
Single-surface restoration	17	17
Multi-surface restoration	17	17
Pre-formed metal crown (excluding Hall)	17	2
Pulpotomy	18	N/A
Extraction	18	N/A

**Results**

Data were obtained for 20 schools. Regarding didactic conventional teaching, 19/20 schools taught single-surface restorations for both dentitions, 18/20 and 19/20 schools taught multi-surface restorations for the primary and permanent dentitions respectively, and 17/20 and 4/20 schools taught pre-formed metal crown placement (PMC) for the primary and permanent dentitions, respectively (Table 1). Concerning conventional clinical skills teaching, 17/20 schools taught both single- and multi-surface restorations for both the primary and permanent dentitions whilst 17/20 and 2/20 schools taught PMC placement for the primary and permanent dentitions, respectively (Table 2). Regarding didactic teaching of alternative treatment techniques, 16/20 and 17/20 schools taught both partial caries removal and restoration/no caries removal and fissure seal for the primary and permanent dentitions respectively and 17/20 and 1/20 schools taught the Hall Technique for the primary and permanent dentitions respectively (Table 3). Concerning alternative techniques within clinical skills

teaching, 13/20 schools taught partial caries removal and restoration for both dentitions, 15/20 schools taught no caries removal and fissure seal for both dentitions and 14/20 and 5/20 schools taught the Hall Technique for the primary and permanent dentitions respectively (Table 4).

**Discussion**

Within the United Kingdom, dental therapists are registered with the General Dental Council and are able to undertake a range of dental treatments most often relating to dental caries or periodontal disease either direct to patients or under prescription from a registered dentist. Therapists are able to work in dental practice either as part of a team of professionals or autonomously and also in the community and schools.

The aim of the current study was to determine the didactic and clinical skills teaching of conventional and alternative treatment techniques for the management of dental caries in paediatric dentistry in dental therapy schools across the UK. Whilst there

appears to be a body of evidence describing teaching for undergraduate dental students, there appears to be a paucity of information concerning teaching within dental therapy/oral health science programmes.<sup>8-10</sup> Traditionally, management of caries in the child/adolescent patient has included local anaesthetic administration, rubber dam application, complete caries removal using rotary instruments and some form of plastic restoration and has been advocated by the British Society of Paediatric Dentistry.<sup>1,2</sup> Such recommendations are based, however, on evidence primarily from specialist paediatric dental practice or from the secondary care setting.<sup>11</sup> It would appear that conventional techniques for managing dental caries are less effective in the primary care setting where the majority of dental treatment is provided within the UK.<sup>12,13</sup>

In addition, such approaches appear not to be popular amongst either the child/adolescent population or dental practitioners as evidenced by epidemiological studies throughout the UK; indeed only around one-tenth of carious teeth are restored in 5-year-old patients in England and 15% within the same age group in Scotland.<sup>14,15</sup> In the 12-year-old patient, this figure rises to 50-55% of carious teeth being managed restoratively.<sup>16,17</sup>

Nonetheless, the results of this survey would suggest that conventional treatment techniques still appear to be taught within dental therapy programmes in the UK, with most recognising the use of rubber dam, sealants/resin and plastic restorations in both primary and permanent dentitions in both the didactic and skills elements of their programmes. Interestingly, the pulpotomy technique appeared to be taught in the majority of schools, although data from both the Scottish Dental Practice Board and the Health and Social Care Information Centre, England would indicate that pulp therapy procedures make up around 1% of all sealant/restorations, and extractions an even smaller proportion of treatments undertaken in primary care.<sup>18</sup>

Teaching of pre-formed metal crowns placed following caries removal was reported primarily for the primary dentition with 4/20 and 2/20 schools teaching use of the technique for the permanent dentition in lectures and skills programmes respectively. The principal usage of the pre-formed metal crown is in the interim management of dental caries or moderate/severe hypoplastic/hypomineralised first permanent molar tooth which is prevalent in up to 15% of a European

**Table 3 Didactic teaching of alternative treatment techniques for the management of caries in the primary and permanent dentitions**

	Primary dentition	Permanent dentition
Render the lesion self-cleansing	14	11
No caries removal and prevention	16	13
No caries removal and fissure sealant	13	14
No caries removal and Hall technique	17	1
Air abrasion	1	3
Chemo-mechanical	5	5
Laser	1	2
Tunnel preparations	1	3
Partial caries removal and restoration	16	17
ICON resin infiltration	0	1

**Table 4 Clinical skills teaching of alternative treatment techniques for the management of caries in the primary and permanent dentitions**

	Primary dentition	Permanent dentition
No skills programme	1	2
Render the lesion self-cleansing	12	9
No caries removal and prevention	14	12
No caries removal and fissure sealant	15	14
No caries removal and Hall Technique	14	5
Air abrasion	1	2
Chemo-mechanical	3	4
Laser	0	1
Tunnel preparation	0	1
Partial caries removal and restoration	13	13
ICON resin infiltration	0	0

population.<sup>19</sup> Nonetheless, use of pre-formed metal crowns for the permanent dentition is not within the remit of the dental therapist as outlined in the General Dental Council's *Scope of practice* document.<sup>20</sup> As such, it is intriguing as to why this mode of treatment is being taught within programmes and may lead an individual on qualification to practise a part of dentistry that is not within their remit.

In relation to alternative strategies, didactic teaching mainly related to no caries removal and prevention only, resin sealant of the carious process or partial caries removal and restoration for both dentitions and a similar pattern was noted within clinical skills programmes. The other biological approach to caries management which appeared to be taught, mainly for the primary dentition was use of the Hall Technique, first described as involving no local

anaesthetic, no caries removal and no tooth preparation prior to placement of a pre-formed metal crown.<sup>21</sup>

Over recent years, alternative techniques for managing the carious dentition have evolved including alternative methods for cavity preparation and excavation such as air-abrasion or dental lasers, non-invasive alternatives such as fluoride varnish or flossing and more recently, micro-invasive approaches which work by either sealing over the carious lesion or infiltrating the lesion with some form of resin.<sup>3-7</sup> Perhaps the most popular techniques of late relate to the biological approach to sealing in caries. One of the original studies which looked at sealing in the carious process in permanent teeth with either composite or amalgam restorative materials demonstrated at 10-year follow-up an arrest in the carious

process.<sup>22</sup> A recent systematic review has confirmed that strategies involving sealing in the carious process for symptomless and vital teeth resulted in a reduced incidence in pulpal exposure with no detriment to restoration longevity, when compared to conventional techniques involving complete caries removal.<sup>23</sup>

Within the UK, there appears to be variation amongst dental schools located geographically close together with considerable inter-school differences in treatment regimens for management of the carious primary dentition.<sup>10</sup> One undergraduate institution within the UK, however, reported a significant increase in placement of Hall crowns for management of the carious primary tooth from over from 1.9% to 75% over a five-year period from 2005 to 2015.<sup>24</sup> Certainly, within primary care, the Hall Technique appears to have become accepted as a standard procedure for management of the carious primary molar tooth and evidence would suggest that Hall crowns outperform conventional restorations in primary teeth prior to tooth exfoliation.<sup>23</sup> Figures from the Scottish Dental Practice Board over a ten-year period, from when the Hall Technique was first introduced to the dental literature, would indicate that the number of pre-formed metal crowns being placed has risen from 14 in 2005/2006 to 10,711 in 2015/2016;<sup>18</sup> recent figures from Public Health England would indicate that a similar number of pre-formed metal crowns being placed within practice in England for the period 2014/2015.<sup>25</sup>

One previous study determined that 15/16 UK undergraduate dental schools and 18/18 dental therapy schools at that time taught the Hall Technique within their curriculum.<sup>26</sup> It is perhaps surprising that a relatively novel technique appears to have been so widely embraced within the dental curriculum of therapy schools within the UK – a paradigm shift in the management of dental caries primarily within the primary dentition. The technique continues to cause debate, particularly amongst specialists in paediatric dentistry within the UK, although a recent survey amongst European post-graduates in paediatric dentistry reported an increasing recognition of the technique in the discipline.<sup>27</sup> Given the apparent shift in teaching towards alternative techniques within dental and therapy schools, it would be interesting to repeat this study in the near future and to extend the study to other teaching institutions more globally.

## Conclusions

Both conventional and alternative treatment techniques for the management of dental caries within paediatric dentistry appear to be taught within dental therapy programmes within the UK. In relation to the latter, no or minimal caries removal with prevention or sealing over the carious processes appeared to be the more favoured options.

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