Scottish Dental
Clinical Effectiveness Programme

SDCEP

Prevention and Management of Dental Caries in Children

Dental Clinical Guidance

April 2010

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Clinical Effectiveness Programme

The Scottish Dental Clinical Effectiveness Programme (SDCEP) is an initiative of the National Dental Advisory Committee (NDAC) and is supported by the Scottish Government and NHS Education for Scotland. The Programme aims to provide user-friendly, evidence-based guidance for the dental profession in Scotland.

SDCEP guidance is designed to help the dental team provide improved care for patients by bringing together, in a structured manner, the best available information that is relevant to priority areas in dentistry, and presenting this information in a form that can be interpreted easily and implemented.

'Supporting the dental team to provide quality patient care'

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Scottish Dental
Clinical Effectiveness Programme

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ISBN 978 1 905829 08 8
First published April 2010

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Prevention and Management of Dental Caries in Children

1 Introduction

1.1 Why this guidance has been developed

- Tens of thousands of children in Scotland suffer from dental caries.
- Many of these children endure pain and infection.
- Even if children do access dental care, much of the disease remains untreated.

"Children have a right to the enjoyment of the highest attainable standard of health, and to facilities for the treatment of illness and rehabilitation of health."

United Nations Convention on the Rights of the Child, Article 24[1]

The multi-factorial nature of dental caries and its association with low socio-economic status contribute to the perception that dental caries is an intractable problem. However, there are effective, evidence-based strategies for the prevention of dental caries and for managing the disease if it does occur.

To date, dental care for children in Scotland has tended to focus on the treatment of disease. Many children's first experience of dental services has been for the management of pain or sepsis associated with dental caries. While some children will continue to present late with established caries, the importance of contact with dental services at an early age with an emphasis on primary prevention is now well recognised. This philosophy is in keeping with a shift in the focus of modern healthcare from acute management to prevention, early identification and early intervention[2,3].

Childsmile is a national programme for improving children's oral health in Scotland (see Appendix 2 and www.child-smile.org)[4]. It is being developed to deliver multidisciplinary primary caries prevention, anticipatory care and appropriate management of caries via NHS dental services and other settings. Childsmile, therefore, provides a mechanism for supporting many of the recommendations set out in this guidance.

The dental team plays a vital role in both preventing and managing caries in children. The dental team also needs to work collaboratively with other professionals and agencies to protect children's health and welfare[5] (as described in Section 13). Currently, information for the dental team is available from a wide range of sources and is of variable quality or direct relevance. This can lead to ambiguity or confusion, making provision of dental care for children all the more demanding.

This guidance works alongside the Childsmile programme and seeks to present clear and consistent advice to support dental professionals to deliver preventive care and, when necessary, to manage caries.

1.2 Why follow this guidance?

Many of the recommendations in this guidance are based on research evidence. If each dental team member in Scotland follows the caries prevention and management strategies presented in this guidance as their standard practice for all their child patients, the experience of dental disease and of dental care for the majority of Scotland's children will be much improved.

1 Introduction

1.3 Scope of this Guidance

'Prevention and Management of Dental Caries in Children' is designed to assist and support Primary Care practitioners and their teams in improving and maintaining the oral health of their child patients from birth up to the age of 16 years. Based on information distilled from a range of sources, this document provides clear guidance on what to do, when to do it and how to do it. It includes advice on:

- assessment of the child
- delivery of preventive care based on caries risk
- choosing from the range of caries management options available
- delivery of restorative care, including how to carry out specific treatments for children
- recall and referral
- providing additional support
- management of suspected dental neglect

Supporting tools that may be of assistance in implementing the guidance are provided in Appendix 5 and include a Care Checklist, Prevention Log, and Prevention Reminder by Age. *'Guidance in Brief'*, a summary version of the main guidance document, is provided separately.

This guidance is based primarily on recommendations within SIGN guidelines 47 and 83[6,7]. For issues not covered by these guidelines, this guidance draws on additional research evidence, guidance and expert opinion.

Other important aspects of children's oral health, including monitoring the developing occlusion, management of trauma and management of the child with additional support needs, are outside the remit of this guidance and are not discussed in detail.

This guidance is directed towards all members of the Primary Care dental team involved in providing oral health care for children in General Practice, Community, and Salaried Dental Services. This includes dentists, dental hygienists, dental therapists, dental nurses, dental health support workers and oral health educators. It is also of relevance to the Hospital Dental Service. Further details about SDCEP and the development of this guidance are given in Appendix 1.

Background information on each topic is followed by recommended actions and more detailed advice in the form of bulleted instructions. In Section 6, **Standard Prevention** actions for all children are presented in amber boxes, with **Enhanced Prevention** actions for those children assessed as at increased risk of developing caries in red boxes.

Throughout this guidance a formal tooth notation system has not been used because it has not been necessary to specify individual teeth. However, when recording information in clinical notes the FDI system is recommended (e.g. 65 for the upper left primary second molar).

1 Introduction

1.4 Statement of Intent

This guidance has resulted from a careful consideration of available evidence, expert opinion, current legislation and professional regulations. It should be taken into account when making decisions regarding treatment in discussion with the patient and/or parent or carer.

As guidance, the information presented here does not override the clinician's right, and duty, to make decisions appropriate to each patient with their consent. However, it is advised that significant departures from this guidance, and the reasons for this, are fully documented in the patient's clinical record.

2 Overarching Principles

The **aims** when providing dental care for children are:

- to keep the primary and permanent dentition free from disease;
- to reduce the risk of the child experiencing pain or sepsis or acquiring treatment-induced dental anxiety if dental caries does occur;
- for the child to grow up feeling positive about their oral health and with the skills and motivation to maintain it.

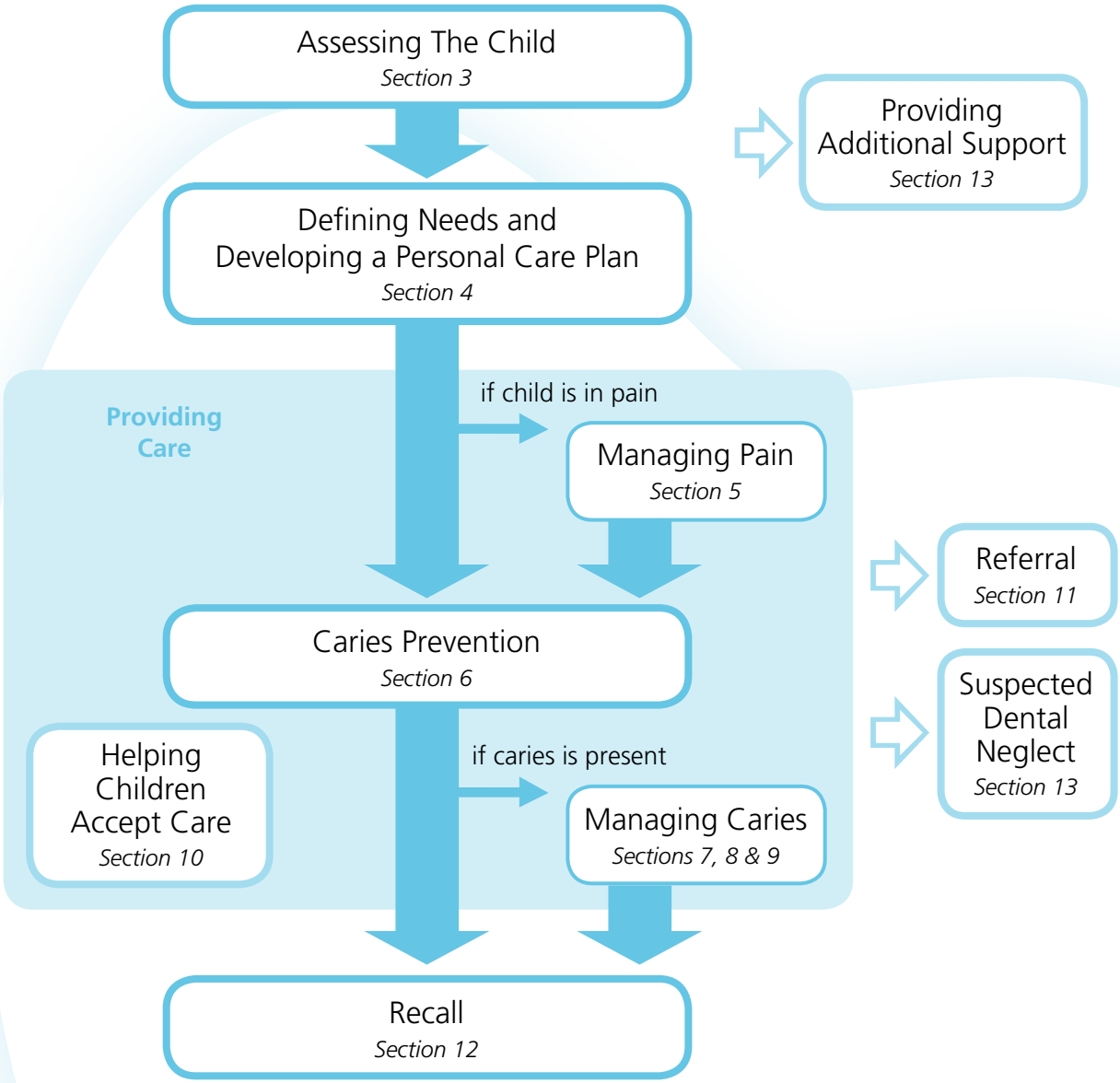
To achieve these aims, the **priorities** for the dental team are:

- to encourage the child's parent/carer to take responsibility for their child's oral health, implement preventive advice at home and meet their obligations to bring their child for dental care;
- to apply the full range of preventive measures to the highest standard possible;
- to focus on prevention of caries in the permanent dentition before management of caries in the primary dentition;
- if caries in the permanent dentition does occur, to diagnose it early, and manage it appropriately;
- to manage caries in the primary dentition using an appropriate technique that maximises the chance of the tooth exfoliating without causing pain or sepsis, while minimising the risk of treatment-induced anxiety;
- to identify as early as possible those children where there is doubt or evidence about a parent/carer's ability to comply with dental health preventive advice, support or treatment uptake, and to contact and work collaboratively with other agencies, especially the child's named Health Visitor, School Nurse or General Medical Practitioner.

In practice, the prevention and management of dental caries in children comprises several stages. This is illustrated in Figure 1 which emphasises that while some children may require pain and/or caries management, all children need caries prevention. Sections of the guidance that describe each stage in detail are included.

2 Overarching Principles

Figure 1 Overview of the prevention and management of dental caries in children

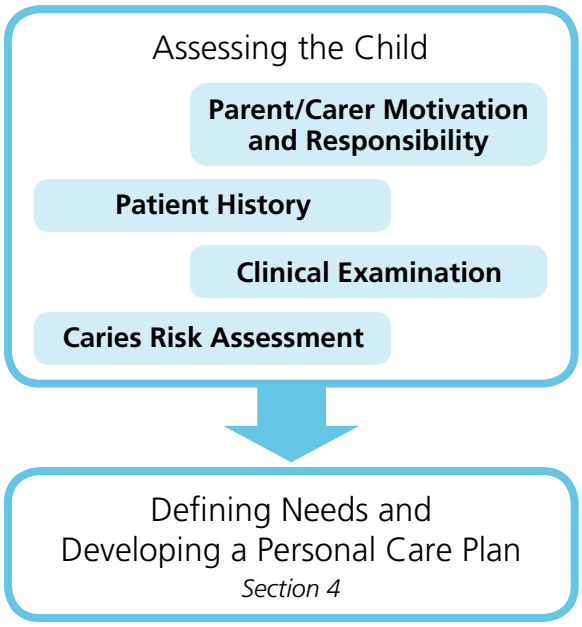


3 Assessing the Child

Successful prevention and management of caries is dependent on an assessment of the child, preferably first carried out while the child is under a year old. Carrying out a comprehensive oral health assessment for all patients is described in the SDCEP *'Guidance on Comprehensive Oral Health Assessment'*[8]. Issues of particular importance for the child patient are discussed in detail in this section.

A comprehensive assessment of a child needs to include several elements if the personal care plan is to be effective in improving the child's oral health. Although these elements are presented in Figure 2 below as discrete individual items, most clinicians assess several of these items simultaneously.

Figure 2 Elements of the assessment of dental caries in children



An assessment of the developing occlusion is also necessary for children in the mixed dentition. This might influence a personal care plan for the prevention and management of dental caries (e.g. when considering first permanent molars of poor prognosis or extraction of primary teeth). However, detailed consideration of the occlusion is beyond the scope of this guidance.

3.1 Gaining Rapport with the Child and Parent/Carer

To provide good patient care, it is essential to gain rapport with both the child *and* the parent/carer and to maintain effective communication throughout all stages of delivering care, starting with assessment. The parent/carer's active participation in the child's oral health care is essential. They might be feeling stress because of apprehension or even feelings of guilt. All members of the practice team, and in particular the receptionist and the dental nurse, have an important role in gaining rapport.

3 Assessing the Child

- Agree whether it will be the dentist or the dental nurse who will have the primary responsibility for welcoming the child or family into the surgery, to avoid confusion.
- Welcome the child as they enter the surgery by:
  - making eye contact
  - greeting them with their name
  - saying something to make them smile
- Gain rapport with the parent/carer.
- Try to involve the child as much as possible in all conversations and do not 'talk over' them.

For further information about behavioural management, refer to Section 10.

3.2 Assessing Parent/Carer Motivation and Ability to Take Responsibility

Children, particularly young children, are dependent on their parent/carer for maintaining their oral health, both for preventive interventions and for bringing the child for dental care. Therefore, the parent/carer's cooperation and active participation greatly facilitates the successful prevention and management of dental caries. Some parent/carers need support and encouragement to be able to accept responsibility for their child's oral health. They might need additional support from a Health Visitor and other community services to achieve this and the dentist has a responsibility to ensure this multidisciplinary support is provided.

However, it is important to acknowledge that there are a number of factors that can contribute to difficulty in establishing healthy behaviours, including:

- education, family health or social issues (e.g. deprivation)
- individuals with differing life priorities
- complex child care arrangements
- parent/carer's lack of knowledge of the cause of dental disease

Therefore, when advising the parent/carer of their key role in improving their child's oral health, each dental professional needs to be aware of the above factors and be empathic, non-judgemental and supportive. Parental ability and motivation to take responsibility for their child's oral health needs to be considered at all stages of providing dental care for children. If this is in doubt or lacking, every opportunity should be taken to provide multidisciplinary support to improve this. Changing people's health behaviour and attitudes takes time and patience, but is possible.

3 Assessing the Child

In some circumstances, where there is lack of compliance with preventive care and advice, and advised and scheduled care is not taken up, dental neglect may be suspected. Dental neglect has been defined as 'the persistent failure to meet a child's basic oral health needs, likely to result in the serious impairment of a child's oral or general health or development'[9]. In such cases, the dentist has a responsibility to the child to pursue this.

Further guidance on providing additional support and identifying and managing suspected dental neglect is provided in Section 13. Note that in some areas, the necessary mechanism to deliver multidisciplinary care might not yet be fully in place.

- Take a full medical, dental and social history to help understand the ability and motivation of the parent/carer and child to maintain oral health.
- Provide appropriate information and support to enable the parent/carer to maintain the child's ongoing oral health and ensure they fully understand the information given.
- Encourage compliance by initially tailoring preventive care and treatment to the situation as it is at present, rather than how you would like it to be or think it should be; for example, be prepared to provide care in phases over an extended period, and to negotiate on the planned treatment.
- If you have concerns about compliance, consider contacting the child's named Health Visitor (for a child under 5 years of age) or School Nurse or General Medical Practitioner (GMP) to seek their advice and support in the future dental health management of the child (see Appendix 5.4 for a template letter).
- If after initial assessment or during subsequent management and consultation with the child's Health Visitor, School Nurse or GMP, you suspect dental neglect of the child by the parent/carer, do not ignore this. Give the advice and care outlined above and also follow the advice set out in Section 13.

3.3 Taking a History

For all patients, a full medical, dental and social history provides essential information to develop an effective personal care plan (see Section 4).

For children, knowledge of the incidence of caries in mother and siblings gathered as part of the social history may help inform a caries risk assessment and in understanding the family's ability and motivation to maintain oral health. It is particularly important to ask about toothbrushing and dietary habits as part of the dental history. By including this at the beginning of every dental examination, the importance of brushing and diet is emphasised to both the child and the parent/carer. It may help to assess motivation and enable targeted prevention (see Sections 3.2 and 6).

Awareness of the child's previous experience of dental treatment will help predict how the child might react to treatment and whether the child is likely to accept treatment. Alternative methods for completing treatment might need to be considered (see Section 10). For some parent/carers, several visits for preventive and restorative care might present difficulties. Knowledge of all this information will help to develop a personal care plan that is tailored to the individual child.

3 Assessing the Child

- Determine the reason for attendance and begin to assess the expectations and motivation of the child and parent/carer regarding oral health.
- Take a full medical, dental and social history, and ensure this is kept up to date.
    - The SDCEP *'Guidance on Comprehensive Oral Health Assessment'*[8] provides further details.
- Ask about caries incidence in mother and siblings.
- Ask about toothbrushing habits. For example: Does the child or the parent/carer brush the child's teeth? How often does the child brush? Which toothpaste is used? Who supervises? Does the child spit out or rinse out after brushing?
- Ask about dietary habits. For example: Does the child take a bottle to bed at night and if so what is in it? How often does the child drink fizzy drinks containing sugar? Does the child have sugar added to hot drinks? What does the child eat between meals? What does the child eat at lunchtime at school? How many portions of fruit and vegetables does the child eat each day?
- Ask about previous experience of any dental treatment: For example: What treatment has been carried out? Does the child have any experience of treatment with local anaesthesia? How anxious is the child about visiting the dentist?
    - Consider completing an anxiety questionnaire with the child (see SDCEP *'Guidance on Comprehensive Oral Health Assessment'*[8]). Refer to Section 10 for behavioural management options.
- Ask the parent/carer if there will be any difficulties in bringing their child for dental visits.
- Use all of the information gathered to inform your assessment of the child and/or parent/carer's attitude towards oral health and their ability and motivation to take responsibility for it.

3.4 Clinical Assessment

For each child, a comprehensive clinical examination that includes a full extra- and intra-oral examination is necessary. Very young children might not cope with a full assessment initially and, therefore, this needs to be introduced gradually.

For most children, dental caries is the most common cause of oral health problems. Although there is a poor correlation between plaque levels and dental caries, assessing plaque levels over time provides valuable information about the child's compliance with one of the most effective preventive interventions, toothbrushing. Regular assessment of the dentition is required to accurately diagnose, manage and monitor carious lesions over time. Because primary teeth are shed, the clinician's priorities when managing carious primary teeth differ from those when managing the carious permanent dentition. This needs to be taken into account when planning care.

3 Assessing the Child

- Assess the child's plaque levels and discuss this with the child and parent/carer (see Section 3.4.6).
- Assess the child's primary and permanent dentition for caries using a tooth-by-tooth approach and discuss with the parent/carer (see Sections 3.4.2–3.4.5). For the primary dentition assess caries, pain and sepsis as follows:

Diagnose carious lesions
(Sections 3.4.1 and 3.4.2)

↓

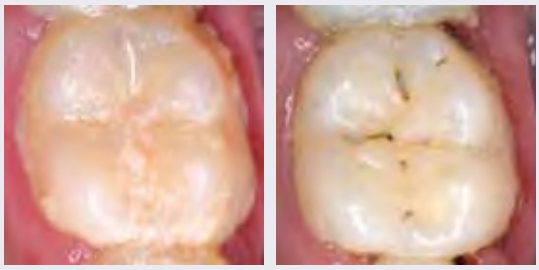
Assess for pain and sepsis
(Sections 3.4.3 and 3.4.4)

↓

Assess the risk of pain or sepsis developing before exfoliation
(Section 3.4.5)

3.4.1 Visual Diagnosis of the Presence of Caries

Reliable clinical diagnosis and recording of carious lesions and restorations can only be achieved if the teeth are clean and dry. Children often have difficulty brushing their teeth and in particular the occlusal surface of molar teeth.



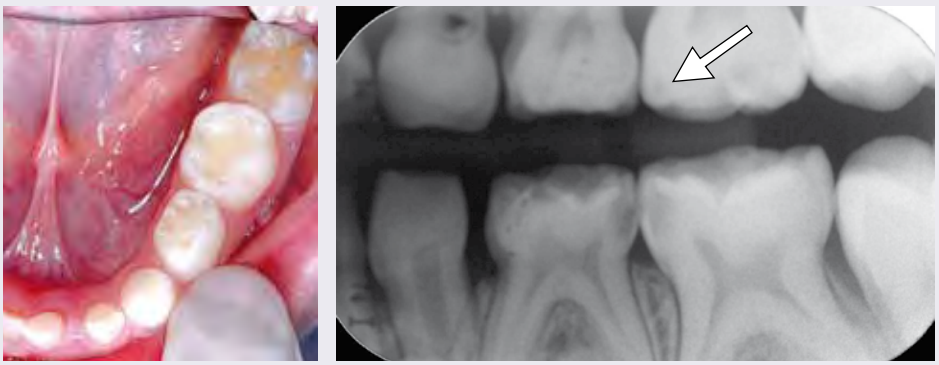
Lower 6 before cleaning and after cleaning

- Ensure all teeth are clean and dry before assessing for the presence of caries.
- Carry out a meticulous surface-by-surface examination and record the findings.
  - Probing is not an acceptable method for diagnosing caries in pits and fissures. Section 7.1 provides further information on diagnosing fissure caries.
  - Probing is an acceptable method of assessing caries activity in exposed dentine.
- Consider the use of ICDAS scoring to chart caries and restorations.
  - The International Caries Detection and Assessment System (ICDAS) is a means of recording the stage of the caries process and status of any restoration or sealant by tooth surface. Further information on ICDAS is available in the SDCEP *'Guidance on Comprehensive Oral Health Assessment'*[8].
- If in doubt whether an approximal lesion is cavitated, consider the use of separators (see Section 7.2).

3 Assessing the Child

3.4.2 Radiographic Diagnosis of the Presence of Caries

The broad contact points of the primary dentition make diagnosis of approximal caries difficult using clinical examination alone. Therefore, bitewing radiographs are an important adjunct to visual diagnosis of caries for children aged four and above. The frequency at which they are taken should be based on an individual caries risk assessment and revised if the child's risk of caries changes. Smaller films are available for use with children (Size 0). When examining radiographs, clinicians need to be aware that some triangle-shaped radiolucencies seen on the mesial surface of upper second primary and upper first permanent molars (e.g. just visible on maxillary E below) can be caused by anatomical anomalies (Cusp of Carabelli) rather than approximal caries[10].



Lower left DE showing no obvious caries visually but advanced, non-cavitated Class II lesions on the radiograph. Arrow indicates an anatomical anomaly rather than caries.

- After clinical examination, for a child who is aged four or above, if no previous radiographs have been taken or are available, take bitewing radiographs to enable accurate caries diagnosis.
- If radiographs have been taken previously, take subsequent bitewing radiographs at the following intervals (as recommended by the Faculty of General Dental Practitioners[11]) based on the child's risk of developing caries (see Section 3.5).
    - For children at increased risk of developing caries: 6–12 months.
    - For all other children: 12–18 months for primary teeth and ~2 yearly for permanent teeth.
- If enamel-only approximal lesions on permanent molars are identified, explain their importance to the parent/carer.
- If there is a valid reason not to take radiographs as specified above (e.g. well-spaced dentition where posterior contacts are examinable and no other caries is visible in the mouth), ensure this is recorded in the patient's notes.

Advice on management of caries in permanent molars and primary teeth is provided in Sections 7 and 8 respectively.

3 Assessing the Child

Taking bitewing radiographs with young children

The majority of young children are happy to have bitewing radiographs taken[7].

- Using age-appropriate language, explain to the child "how much you would like to have the pictures, to help in looking after their teeth".
- Where possible, use film holders. If this is not possible, consider using paper or sponge tabs.

Two E speed, Size 0 films with, a film holder on the left and adhesive paper tabs on the right

Setting up the film holder

Applying the adhesive tabs

Example of a 5-year-old boy having a bitewing radiograph taken with a film holder and an adhesive tab

3.4.3 Assessing for Pain

Some children are not reliable in reporting pain either because they have not yet developed the necessary communication skills or because they wish to avoid dental treatment. Also, children might become anxious about an exfoliating tooth that they report as painful, until reassured.

- When obtaining a patient history, be aware that the child might not report pain reliably. Include input from the parent/carer as well as the child and ask whether there have been any problems with eating or drinking.

Advice on pain management is given in Section 5.

3 Assessing the Child

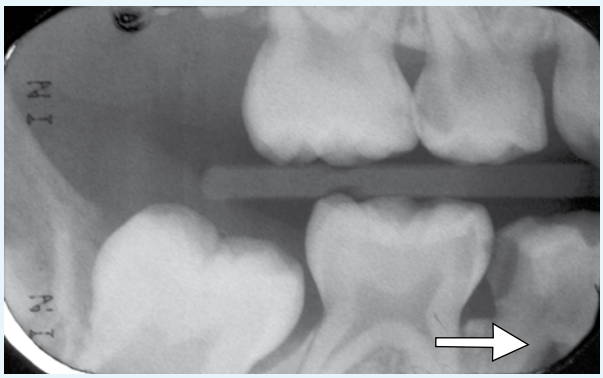
3.4.4 Assessing for Sepsis in Primary Teeth

Dental sepsis (sinus or abscess) can be difficult to diagnose because the clinical presentation can vary. Sinuses are not always obvious, but if present are usually located on the non-attached mucosa adjacent to the attached mucosa. A slight cleft or notch may also be noted in the adjacent gingival margin.

It is now regarded to be unacceptable to leave dental sepsis in the mouth[12]. There are three treatment options: extraction of the tooth, pulp therapy if feasible or, in exceptional circumstances, it may be possible to monitor asymptomatic dental sepsis for up to three months while the child is acclimatised to the dental treatment necessary to manage the dental sepsis.

Look for the following indicators of established dental sepsis (as illustrated below):

- inter-radicular radiolucency
- tenderness to percussion in a non-exfoliating tooth
- alveolar tenderness, sinus or swelling
- non-physiological mobility (compared with the healthy contralateral tooth) when the tooth is gently rocked bucco-lingually with the points of a pair of tweezers placed on the occlusal surface



Sinus with associated inter-radicular radiolucency of lower D

Alveolar inflammation that, on gentle palpation, releases infected material from a lower D

Assessing for the increased, non-physiological mobility often associated with sepsis

3 Assessing the Child

- Do not leave dental sepsis untreated. Provide pulp therapy (Section 9.1) or extract the tooth.
- If dental sepsis is asymptomatic and the child is particularly anxious, monitor with active behaviour management for up to three months to allow time for the child's level of anxiety to be managed to enable them to accept the necessary treatment (extraction or pulp therapy).
- If within this time the child does not respond to anxiety management, consider referral to a specialist centre (see Section 11).

3.4.5 Assessing the Risk of Pain or Sepsis Developing Before Exfoliation

When examining the primary dentition, the clinician needs to assess the risk of each carious lesion in primary teeth progressing to pain or sepsis in order to decide on the most appropriate management option. Not all carious lesions require operative management. To make this decision several factors have to be considered, including:

- extent of the lesion
- site of the lesion
- activity of the lesion
- time to exfoliation
- number of other lesions present in the dentition
- anticipated cooperation of the child now and in the future
- anticipated cooperation of the parent/carer with the preventive interventions
- the range of clinical procedures the clinician is able or willing to provide

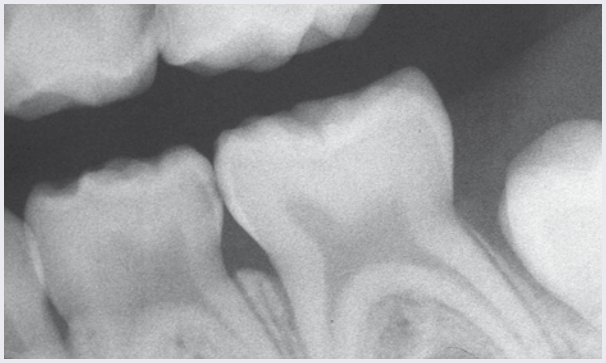
With so many variables, it is not possible to clearly define specific criteria that will accurately predict which carious lesions will result in pain or sepsis for the child. The clinician needs to use their skill and judgement when carrying out this risk assessment.

Caries activity is variable, and lesions can arrest or have the potential to arrest. Carious lesions that are slowing or arrested tend to be hard to probing and dark in colour. However, some arrested lesions can be light in colour. Examples of teeth with different carious lesions assessed as at high or low risk of developing pain or sepsis are shown in the two sets of photographs below. These are intended as a guide only.

3 Assessing the Child

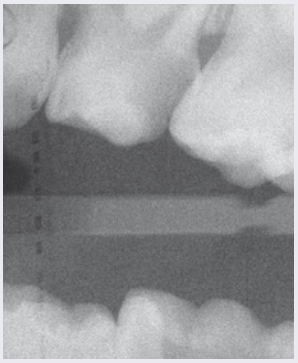
Lesions in primary teeth with high risk of causing pain or sepsis

None of the following lesions have clinically evident signs or symptoms of pain or sepsis, but are likely to be associated with pain or sepsis before exfoliation if left unmanaged.



Early distal lesion, lower D in a 5-year-old child

Active lesion, lower E in a 5-year-old child



Upper D with radiographic exposure of pulp

Primary molars with clinical exposures of necrotic pulps and several years to go before exfoliation

3 Assessing the Child

Lesions in primary teeth at low risk of causing pain or sepsis

None of the following lesions has clinically evident signs or symptoms of pain or sepsis, and it is likely that they will proceed to exfoliation without causing further problems, provided they are closely monitored and the patient is given Enhanced Prevention (see Section 6 for details).

Upper Ds and Es with clinical exposures of vital pulps
(pulp polyps unlikely to cause sepsis before exfoliation)

Retained root, lower D
(dark coloured but hard)

Arrested caries lower CDE
(dark coloured but hard and cleansable cavity)

Arrested caries, upper D
(light coloured, but hard)

Note that although a pulp polyp in a carious primary molar indicates that at least one of the root canals is vital, the other canals may be necrotic. If there are signs or symptoms of sepsis, then extraction or pulp therapy is required.

- Assess the risk of each diagnosed carious lesion causing the child pain or dental sepsis, prior to exfoliation, before deciding on a management option.

3 Assessing the Child

3.4.6 Assessing Plaque Levels

Assessing and recording levels of visible plaque at each examination, and sharing this information with the child and their parent/carer, will help reinforce the importance of effective toothbrushing. An example of a quick method of recording plaque levels, and presenting the information in terms the child will understand, is to give marks out of 10 as follows:

perfectly clean tooth 10/10 | line of plaque around the cervical margin 8/10 | cervical third of the crown covered 6/10 | middle third covered 4/10

Record the worst score in each sextant, for example:

8/10	6/10	8/10
8/10	6/10	8/10

It is also important to assess the surface of open carious lesions for plaque that is visible or evident when an instrument is gently drawn across the surface of the lesion, particularly if considering managing the lesion with a prevention-alone approach (Section 8.4).

- Consider recording plaque scores at each examination, particularly if the child is assessed as at increased caries risk.
- Record the presence of plaque on the surface of open carious lesions at recall visits for lesions where the prevention-alone management strategy has previously been selected (see Section 8.4).

3 Assessing the Child

3.5 Caries Risk Assessment

The caries risk assessment is an important part of the assessment of the child and enables the development of an appropriate individualised personal care plan based on the child's susceptibility to disease. The SDCEP *'Guidance on Comprehensive Oral Health Assessment'*[8] provides further information on risk assessment. All children are at risk of developing dental caries and, therefore, require some preventive intervention. Some children are at increased risk of developing caries. Identifying these children enables additional prevention to be delivered to them.

The three main evidence-based indicators[6,7] of a child being at increased risk of developing caries within the next three years that are important to consider in the dental surgery are:

- **Previous caries experience** – any decayed, missing or filled teeth
- **Resident in an area of deprivation** – the home postcode can be used to identify whether a child lives in a deprived area (SIMD Quintile 1 is the most deprived 20% of the population; see Appendix 3)
- **Healthcare worker's opinion** – referral from a Health Visitor, Public Health Nurse or Dental Health Support Worker who has identified the need for additional preventive care

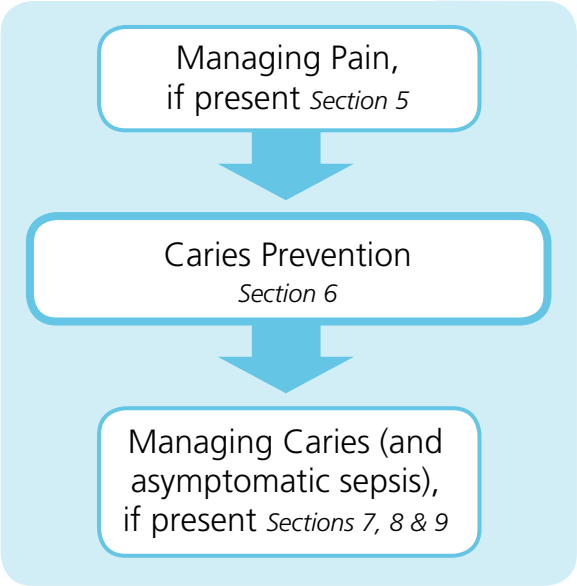
- Based on the above indicators, your knowledge of the child and the history taken (including, caries incidence in siblings, toothbrushing and dietary habits; see Section 3.3), use your subjective clinical judgement to assess whether a child is at increased risk of developing caries.
- Use the caries risk assessment to inform the frequency of review radiographs (see Section 3.4.2), provision of preventive interventions (see Section 6) and frequency of recall (see Section 12).

4 Defining Needs and Developing a Personal Care Plan

The information gathered from the assessment of the child will enable a diagnosis to be formulated. From this, the needs to be addressed and the proposed interventions to manage them can be listed and prioritised into a personal care plan.

For any care plan to be successful, it must be tailored to a realistic assessment of the child's ability to accept treatment and aim to increase the likelihood of behavioural change to improve oral health. In addition, the parent/carer's support is essential in bringing their child for care and in supervising preventive interventions. Therefore it is crucial to fully discuss and explain the treatment options with the child and parent/carer, before agreeing a proposed care plan and gaining their consent to it.

The accepted sequence for planning and providing care is as follows.



Although some children may require pain management or caries management, **it is imperative that all children receive caries prevention.**

There is wide variation among dentists when planning care for the same patients and it is unlikely that there will be a single optimal plan for a particular child patient.

For children with caries, many factors can influence the choice of management strategy. Some examples are shown overleaf.

4 Defining Needs and Developing a Personal Care Plan

Factors complicating caries management

- Children can find operative treatment unpleasant.
- Dentists can find operative treatment on children difficult to provide.
- Children with decay tend to have multiple teeth affected.

Factors simplifying caries management

- Primary teeth have a limited lifespan, so slowing caries progress may be sufficient.
- Many children and parents/carers are happy with prevention of pain and sepsis as a treatment goal for primary teeth, with restoration of function and aesthetics of secondary importance.

In view of these influencing factors, the optimum strategy will vary and no single approach will suit every dentist, every child or every carious tooth. Furthermore, not all carious lesions in primary teeth require operative management (see Section 3.4.5).

The first priority is to keep the 6s and 7s free from both occlusal and approximal caries. If caries is diagnosed at these sites, then it must be managed appropriately (see Section 7).

The next priority is to reduce the risk of any caries in the primary dentition resulting in pain or sepsis before the tooth exfoliates. This can often be achieved without using the standard adult restorative approach, but instead selecting an appropriate caries management strategy that reduces the risk of causing treatment-induced anxiety (see Section 8).

- Discuss and explain caries prevention and, if necessary, caries management options with the child and parent/carer.
- If required, include in your planned collaboration with the child's Health Visitor or School Nurse to offer and provide additional home and community support for preventive interventions (see Section 13).
- Plan to carry out any preventive interventions for permanent teeth before treatment of the primary teeth (e.g. fissure seal first permanent molars before restoring primary teeth).
- Devise and agree an initial care plan with the child and parent/carer that includes the expected number and duration of appointments, but be prepared to modify it if the child is unable to accept some treatments or there are changes in caries activity.
- Obtain informed consent for the agreed care plan (refer to the SDCEP *'Practice Support Manual'*[13] for further details of consent).
- Consider dividing treatment into several stages, with a month or two between stages, if there are concerns about child or parent/carer compliance.
- Ensure complete and accurate records are kept (refer to SDCEP *'Practice Support Manual'*[13] and *'Guidance on Comprehensive Oral Health Assessment'*[8] for further information).

5 Managing Pain (if present)

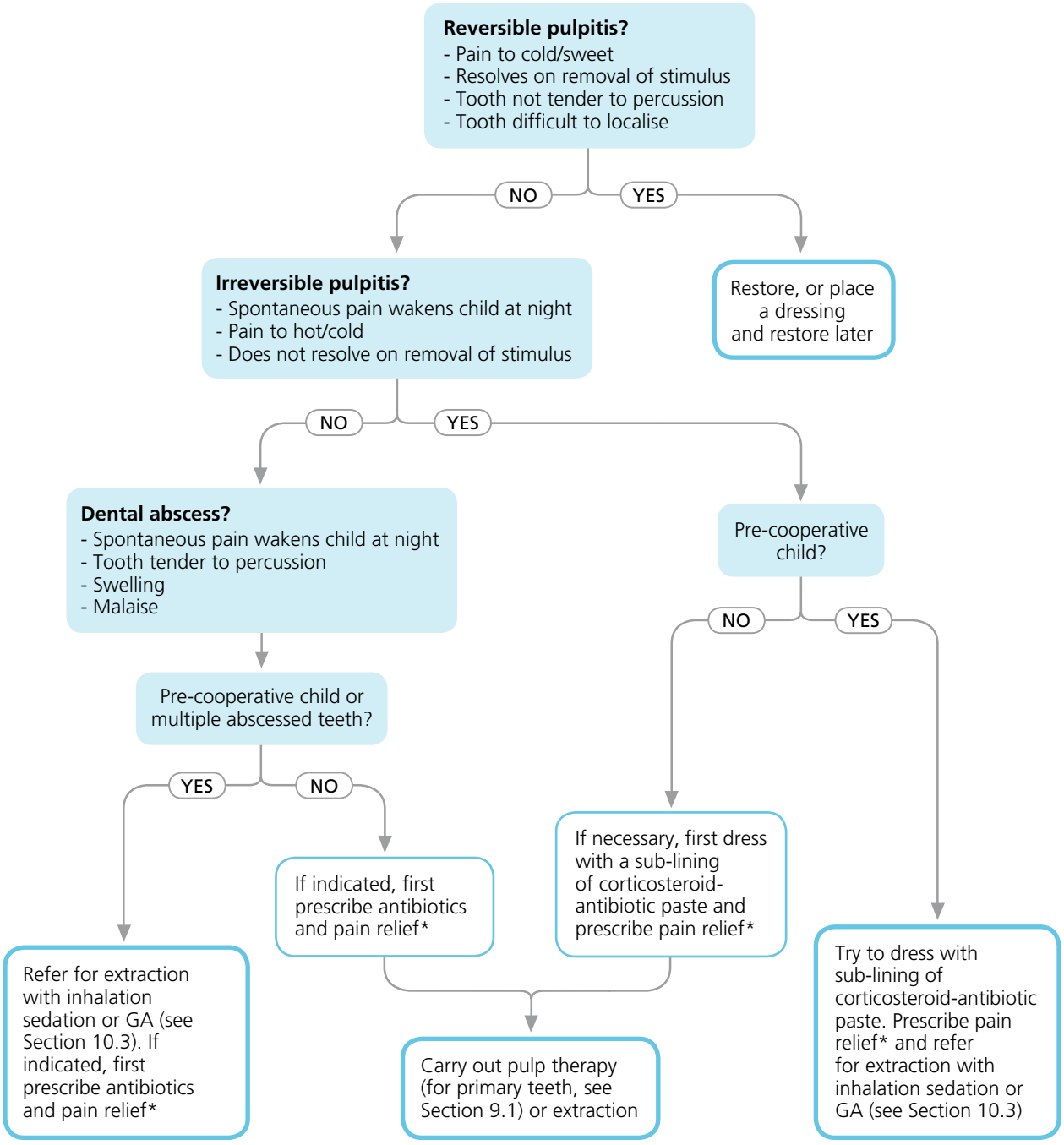
Dental pain is often the principal reason for a child's unscheduled attendance for dental care. The treatment provided will depend on the diagnosis and child's ability to cope. Although it is vital that a child's pain is managed promptly, if a dental extraction is indicated, it is generally in the child's best interests in the long term to avoid an extraction if it is the first visit. This is to minimise future anxiety about dental treatment and increase the likelihood that the child will return to complete a planned course of treatment.

It may be possible to retain pulpally involved primary molars using pulp therapy rather than extraction. Therefore, a pulp therapy should be considered as a treatment option if the child is cooperative (see Section 9.1). It is only appropriate to consider referral for extraction under inhalation sedation or general anaesthesia if a child is either very young, pre-cooperative or has multiple abscessed teeth.

- Manage pain as the first priority when providing care.
- Diagnose the pain and determine a suitable management strategy. The flow diagram in Figure 3 illustrates this process for a child with no medical complications.
- If a child is pre-cooperative (e.g. a young or learning disabled child) or has multiple abscessed teeth, consider referral to assess suitability for extractions under inhalation sedation or general anaesthesia (see Section 10.3).
- **Try to avoid dental extractions on the first visit if at all possible.**

5 Managing Pain (if present)

Figure 3 Diagnosis and management of a child with caries-related dental pain and no medical complications



*Refer to the SDCEP *'Drug Prescribing for Dentistry'* guidance[14].

6 Caries Prevention

Dental caries is not inevitable and can be prevented. There are four simple and effective evidence-based interventions available to the dental team:

- toothbrushing with fluoride toothpaste
- dietary advice
- topical fluoride
- fissure sealants

These are described in Sections 6.2–6.5 and can be provided by any suitably trained member of the dental team. In addition, the child's parent/carer with responsibility for the oral health of their child has a crucial role in following preventive advice and supervising many of these interventions. Encouraging parent/carers to begin attending the dental practice with infants will assist the child's acclimatisation to the practice environment and enable preventive advice to be given to the parent/carer at an early stage. The motivation of both the child and the parent/carer is discussed in Section 6.1.

As every child is at risk of developing caries, preventive intervention is required for all children. These interventions are described in this guidance as '**Standard Prevention**' and are presented in amber boxes in Sections 6.2–6.5. For children assessed to be at increased risk of caries, additional preventive interventions are necessary, and are termed '**Enhanced Prevention**' and presented in red boxes in Section 6.2–6.5.

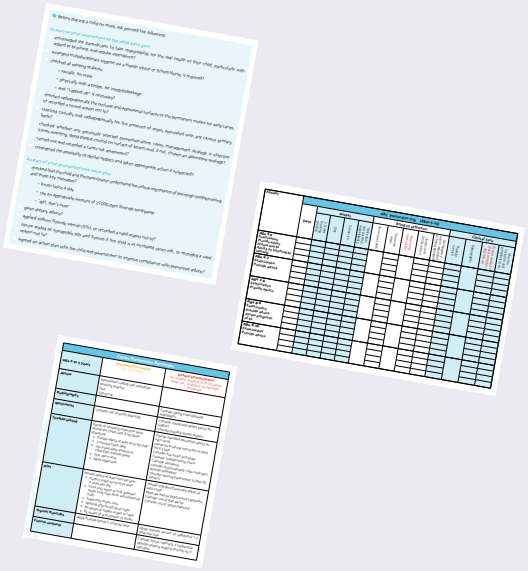
- Ensure that all children receive **Standard Prevention** appropriate to their age.
- If the child is at increased risk of developing caries, in addition to Standard Prevention, ensure they receive **Enhanced Prevention**, unless there is valid reason not to. In this case, ensure this is documented in the patient's notes.
- When giving preventive advice, ensure that both the child and the parent/carer who is responsible for supervision are included in the discussion.
- After relief of any pain, carry out any preventive interventions for permanent teeth before treatment of the primary teeth (e.g. fissure seal first permanent molars before managing carious primary teeth).

In addition to the crucial preventive interventions provided by the dental team, the Childsmile programme also promotes multidisciplinary prevention and oral health care for children across Scotland in other settings. Those children who are resident within the most deprived areas are targeted to receive specific additional preventive interventions through Childsmile. Further information is available in Appendix 2.

6 Caries Prevention

Various supporting tools to assist the dental team deliver appropriate preventive care are provided in Appendix 5 and can be downloaded from the SDCEP website: www.scottishdental.org/cep. These include:

- Care Checklist – a reminder of the essential elements of the assessment, prevention and management of caries in children
- Prevention Log – can be used to keep a record of preventive interventions for an individual child
- Caries Prevention Reminder by Age – a summary of preventive interventions appropriate for children year-by-year from birth to 16 years of age



6.1 Motivating and Action Planning

Information gathered during the assessment of the child provides an understanding of the child's current oral health practice, the family's ability and attitude towards maintaining oral health and motivation to take responsibility for it (Section 3).

As knowledge does not readily translate into behaviour change, providing caries prevention advice alone has variable success in influencing patients. However, there is evidence that forming an action plan increases the likelihood that a patient will perform a behaviour, and a recent study in young adults showed action planning to have a significant effect on compliance with oral care[15].

To enable implementation of preventive advice, convey the information to the patient as follows.

- Use questioning that is empathic and non-judgemental to identify specific areas of the current behaviour that could be targeted to improve oral health, ideally helping the parent/carer to identify these areas themselves.
- Using a sympathetic approach that acknowledges the difficulties for the parent/carer in changing behaviours, provide advice about the ideal oral health behaviour, ensuring the child and the parent/carer appreciate why changing their behaviour would benefit them.
- Assess if there is any apparent willingness to change current behaviour.

6 Caries Prevention

- If the child or parent/carer is lacking motivation to change:
  - provide encouragement using verbal persuasion;
  - identify barriers to change and try to resolve them (e.g. where the complaint is that the child only likes "children's" toothpastes, recommend an adult strength toothpaste with a mild flavour) and ensure the goals are achievable;
  - provide instruction which actively involves the parent/carer and child (such as hands-on brushing instruction and use of a food and drink diary).

- Consider developing an individual action plan for the child as follows:
  - identify a convenient time and place for the preventive behaviour to occur (e.g. toothbrushing after breakfast in the morning and last thing at night), and a date for when the task is to be started (ideally from the day of the appointment) and who is to carry it out
  - identify a trigger as a reminder for the child or parent/carer to carry out the preventive behaviour (e.g. when the child gets ready for bed)
  - agree a date to review progress (e.g. assess oral hygiene at the next visit)
  - agree the action plan with the child and parent/carer and write this down for them if necessary, possibly on a copy of a food and drink diary or toothbrushing chart
  - record the action plan in the child's notes so that reference can be made to it at a subsequent visit
  - at the next visit, provide encouragement, further advice and revise the action plan if necessary.
- While discussing the action plan, assess the parent/carer or child's ability and motivation to comply and if there is doubt about this, discuss collaboration with the Health Visitor or School Nurse as a source of community/home support for the child and include this in the action plan.

Examples of action plans

- For a 6-year-old child, the parent/carer will supervise the child's brushing at home every morning after breakfast and brush the child's teeth for them every evening after dinner, when the child gets ready for bed.
- When preparing the child's packed lunch, the parent/carer will give the child a bottle of water instead of a soft drink every day.
- A child will note on a toothbrushing chart every time they brush their teeth at home and bring the chart back at the next visit to receive a sticker.

6 Caries Prevention

6.2 Toothbrushing with Fluoride Toothpaste

Toothbrushing with fluoride toothpaste is one of the most effective methods for preventing caries[7].

Standard Prevention for all children

- **At least once a year, provide the following toothbrushing advice.**
  - **Brush for at least two minutes twice daily,** in the morning and last thing at night before bed with nothing to eat or drink after brushing at night.
    - Brushing twice a day offers increased protection, with brushing last thing at night likely to be particularly effective due to retention of fluoride in the mouth.
    - Toothbrushing at school or nursery as part of Childsmile is in addition to these two occasions.
  - **Use the correct amount of a toothpaste with age-appropriate fluoride concentration**
    - Under 3 years old: use a small smear of paste containing not less than 1000 ppm fluoride.
    - 3–6 years inclusive: use a pea-sized amount of paste containing not less than 1000 ppm fluoride.
    - 7 years old or over: use paste containing 1350-1500 ppm fluoride.

  - **'Spit, don't rinse'**
    - Children who spit out and don't rinse after brushing show an extra 10% reduction in caries experience compared with those who rinse their mouth out with water after brushing.
  - **Help children until at least 7 years old**
    - Children only have the manual dexterity to brush their own teeth from 7 years onwards; therefore, until then the parent/carer must take responsibility.
  - **Continue to supervise children older than 7 years until confident in their brushing habits**
- In the early stages of providing care, give hands-on brushing instruction (~3 minutes).
- Consider the use of action planning to encourage change (see Section 6.1).
- Advise the parent/carer to start brushing as soon as the first primary tooth erupts.
- Advise the parent/carer not to allow the child to eat or lick toothpaste.
- Emphasise to teenagers the importance of regular brushing for oral health and the additional positive effect on appearance and general health.

6 Caries Prevention

Enhanced Prevention for children at increased risk of caries

- **At each recall visit, provide Standard Prevention as detailed above.**
- **Give hands-on brushing instruction** to the child at least once a year (~3 minutes) (see technique overleaf).
- Choose additional preventive interventions depending on the child's circumstances as follows.
  - Disclosing plaque at the brushing instruction visits.
  - Giving the parent/carer disclosing tablets to use at home or recommending using them.
  - The use of toothbrushing charts that the child or parent/carer can use to record each time the child's teeth are brushed as a reminder about brushing frequency (an example is available via the SDCEP website).
  - Providing a free toothbrush and free toothpaste.
  - Encouraging motivated parent/carers to floss the child's teeth at the D/E/6 contacts 2–3 times per week immediately after brushing, particularly if enamel-only caries is present on the mesial of 6s (see technique below).
  - Recommending the use of 1350–1500 ppm fluoride toothpaste for children over 3 years old.
  - Prescribing 2800 ppm fluoride toothpaste for children over 10 years old (see SDCEP *'Drug Prescribing for Dentistry'* guidance[14] for details).
  - Collaboration with the Health Visitor or School Nurse to provide community/home support for toothbrushing.

6 Caries Prevention

Toothbrushing instruction technique

- Empathise with the parent/carer about how difficult it can be with small children to brush properly, but give advice (as described above) and reinforce the importance of following it.
- Ask the child or parent/carer whether they would prefer to: (1) brush all surfaces of a sextant, before moving on to the next sextant; or (2) the same surface of each complete arch, before moving onto the next surface (all cheek, all palate, all biting surfaces).
- If the parent/carer is brushing the child's teeth, ask them if they would prefer to stand behind their child, or kneel in front of the child.
- Demonstrate the chosen technique on the child, and then encourage the child or parent/carer, or both, as appropriate for the age of the child, to show you.
    - For example, the dental team member brushes one arch and then encourages the parent/carer to brush the other arch.

- Instruct the use of a short, scrubbing motion. Consider teaching the child to recognise the sound of the correct scrubbing motion (ask them to listen for a 'shh- shh' sound).
- Advise that it will take at least two minutes brushing to clean all tooth surfaces and gums. Using a timer might help motivate the child.
- When 6s or 7s are only partially erupted, show the child and parent/carer how brushing in line with the arch can miss the vulnerable occlusal surface of these teeth, and emphasise the need to brush the occlusal surface from the side of the mouth.

Flossing technique

- For motivated parent/carers, consider encouraging the use of dental floss, or floss wands, for the D/E/6 contacts 2–3 times per week immediately after brushing.
    - This is particularly relevant where radiographic examination has identified early, enamel-only lesions on the approximal surfaces of permanent molars.

Parent standing behind the child to floss the teeth

Flossing the child's teeth using a floss wand

6 Caries Prevention

6.3 Dietary Advice

Frequent sugar consumption is the major cause of dental caries[7].

Standard Prevention for all children

At least once a year, give dietary advice for oral health as follows.

- **Restrict food and drinks containing sugar to no more than four occasions in any one day**
  - Confining sugar-containing foods and drinks to meal times reduces the time that teeth are exposed to acid attack. Therefore 'grazing' sugar-containing foods between meals and sipping soft drinks containing sugar or acid over prolonged periods should be discouraged.
- **Drink only water or milk between meals**
  - Cows milk is non-cariogenic.
  - Drinks containing sugars such as sweetened milk, soy formula milk and fruit juices increase the risk of caries.
  - From 1 year old up to at least 2 years old, children should drink full-fat cows milk. This will provide the child with extra required calories and vitamins A and D.
  - After the age of 2 years semi-skimmed milk is acceptable if introduced gradually.
  - Skimmed milk is only suitable for children over 5 years old as it contains too few calories and minimal vitamin A.
  - Further advice is available from the Food Standards Agency: www.eatwell.gov.uk/.
- **Snack on sugar-free snacks** such as fresh fruit, carrot, peppers, breadsticks, oatcakes and occasionally a small amount of cheese.
  - Although fruit does contain natural sugars, at normal consumption levels there is no evidence that it is cariogenic.
  - Cheese can provide some protection against caries but is high in fat.
- **Do not place fruit juices, sweetened milk or soy formula milk in feeding bottles**
  - If a child has a bottle at bedtime, it is important that it only contains water.
- **Do not eat or drink after brushing at night**
- **Be aware of hidden sugars in food**
  - Many processed foods (e.g. some yoghurt, cereals, crisps) contain sugars. Added sugars include honey, sucrose, glucose, maltose, dextrose, fructose, hydrolysed starch, corn or maize syrup, molasses, raw/brown sugar, treacle and concentrated fruit juice[16].
  - Labels show 'carbohydrate' (of which sugars): 15 g per 100 g is high; 5 g per 100 g is low[17].
- **Be aware of acid content of drinks and restrict fizzy, acidic drinks to meal times**

6 Caries Prevention

Enhanced Prevention for children at increased risk of caries

- **At each recall visit, provide Standard Prevention as detailed above.**
- Consider additional preventive interventions depending on the child's circumstances as follows:
  - The use of a food and drink diary.
    - The child or their parent/carer keeps a record of all food and drink consumed over a three-day period, with at least one of the days being at the weekend. A member of the dental team reviews the diary and offers advice if necessary
  - Action planning to encourage change (see Section 6.1).
- Consider collaboration with the Health Visitor or School Nurse to provide community/home support for dietary change.

Advice for general health

- In addition to the diet advice described for Standard and Enhanced Prevention whenever possible, provide the following dietary advice for general health.
  - Base meals on starchy foods.
  - Eat lots of fruit and vegetables.
  - Eat more fish.
  - Cut down on saturated fat and sugar.
  - Eat less salt.
  - Drink plenty of water.
- Support and promote breast feeding.
  - Ideally, infants should be exclusively breast fed for the first 6 months of life after which they should receive nutritionally adequate complementary foods while breastfeeding continues.

For further detailed advice about nutrition for healthy teeth, refer to the Childsmile Care Manual available at www.child-smile.org[4] or *Nutrition for Dental Health – Guidelines for Professionals*[18]. For more information about dietary advice for general health refer to www.healthscotland.com/food-and-health.aspx or www.takelifeon.co.uk.

6 Caries Prevention

6.4 Other Topical Fluorides

In addition to fluoride toothpaste, there is a range of topical fluoride delivery systems, including mouthwash and varnish that can be used to help prevent caries in children[7,19].

Standard Prevention for all children

- **Apply sodium fluoride varnish (5%) twice a year to children over 2 years of age** (see note and application technique below).
  - Although a child might additionally receive fluoride varnish twice a year from the targeted component of Childsmile in nursery or school, it is acceptable for children to have varnish applied four times per year.
  - If residual varnish is visible or the child has had varnish applied in the past 24 hours (e.g. from Childsmile), leave application until the next visit.

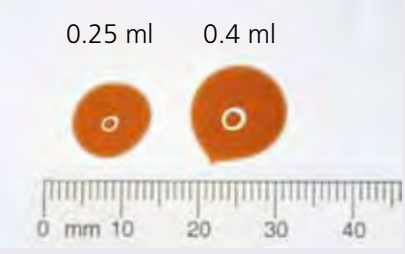
Enhanced Prevention for children at increased risk of caries

- **Apply sodium fluoride varnish (5%) an additional 1–2 times per year to children over 2 years of age,** unless provided via Childsmile in nursery or school (see note and application technique below).
- Consider advising the use of an alcohol-free sodium fluoride mouthwash for children from 7 years of age (see SDCEP *'Drug Prescribing for Dentistry'* guidance[14]).

Note Many varnishes contain colophony (e.g. Duraphat). A child who has been hospitalised due to severe asthma or allergy or who is allergic to sticking plaster may be at risk of an allergic reaction to colophony. In these cases, either use a colophony-free varnish or suggest the use of alternative age-appropriate fluoride preparations (e.g. mouthrinse or higher fluoride-containing toothpaste).

Fluoride Varnish Application Technique

Fluoride varnishes contain high concentrations of fluoride. Do not apply more than the manufacturer's recommendations. For example, for Duraphat varnish which contains 22,600 ppm fluoride, the manufacturer's recommended dose for children aged 2–5 years is 0.25 ml and for 6 years and older is 0.4 ml.



Approximal surfaces of primary teeth are particularly prone to caries[7]. Therefore, it is particularly important to include these areas when applying varnish to tooth surfaces.

6 Caries Prevention

- Isolate and thoroughly dry the teeth a quadrant at a time to optimise adhesion of the varnish to the tooth.

- Apply a small amount of fluoride varnish using a small brush.

- Advise that the child should eat soft food and should not brush their teeth for the rest of the day.

6.5 Fissure Sealants

Fissure sealants have been shown to reduce pit and fissure caries in primary and permanent teeth[6,7]. There is evidence that they are more effective in reducing decay in occlusal surfaces than fluoride varnish[20,21].

Enhanced Prevention for children at increased risk of caries

- **Place sealants in all pits and fissures of permanent teeth** if you assess the child, or a particular tooth, as at increased risk of developing caries.
  - Resin–based sealants are the first choice of material (see application technique below).
  - Remember the buccal pits of lower 6s and the palatal fissures of upper 6s.
- Consider using glass ionomer cement as a temporary sealant on partially erupted first and second permanent molars until the tooth is fully erupted, or on fully erupted teeth where the child is pre-cooperative.
- If unable to provide fissure sealants (e.g due to the child being pre-cooperative or learning disabled), then refer the child to have this treatment provided (see Section 11).
- Consider fissure sealing Es, 4s and 5s, and palatal pits on upper 2s.
- **Check existing sealants** for wear and integrity/leakage at every recall visit.
- **'Top up' worn sealants** if the child is still at increased risk of caries.

6 Caries Prevention

Resin fissure sealant application technique

Fissure sealants must be placed with careful attention to technique if they are to show good long-term retention. However, even well-placed sealants wear or are lost over time. Therefore, they must be monitored and topped up with additional resin if they wear sufficiently to expose fissures while the child is still assessed as at increased risk of caries.

- Clean the tooth using one of the following methods to ensure it is free from obvious debris (use of a 3-in-1 syringe alone is usually insufficient to clean fissures if debris is present).

Wipe the tooth with cotton wool pledget.

Clean with a toothbrush with no paste.

Use a bristle brush without prophy paste.

Gently dredge the fissures with a probe taking extreme care to avoid damaging the enamel.

- Check the air line is free from water by blowing air onto the mirror surface to reveal any water contamination.

- Isolate the tooth using cotton wool rolls, mouth mirror and saliva ejector and consider the use of dry guard.

6 Caries Prevention

Etch the tooth.

Dry the tooth to avoid diluting the etch.

Apply the etch (30% phosphoric acid, not self-etch products) for 30 seconds.

Wash the etch, positioning the high volume aspirator so that the water will flow off the tooth into the aspirator.

Apply the sealant.

Avoid moisture contamination of the tooth when changing cotton wool rolls. Dry the tooth surface, until the entire surface is frosty.

Apply resin to etched enamel, ensuring the resin flows without air inclusions to cover approximately a third of the incline of the cusp. Do not allow resin to overflow into gingival sulcus as this might compromise the seal.

Light cure the sealant.

Check the sealant.

Wipe the air-inhibited layer from the surface of the sealant as children find the taste distressing.

Check for flash and the integrity of the sealant with a probe.
If the sealant can be picked off with a probe, then it is almost certainly leaking and needs to be removed.

6 Caries Prevention

Monitoring fissure sealants over time

A fissure sealant is only effective when all the fissures are fully covered by resin. Fissures should be monitored at each recall visit and fissure sealants maintained until the child is no longer at increased risk of caries[6].

- Visually check fissure sealants

With clear sealants, opalescence visible at the sealant/tooth interface usually indicates leakage and demineralisation. This sealant should be removed.

- Physically check fissure sealants with a probe.

An apparently sound fissure sealant at recall visit.

Probe inserted under palatal extension, which lifts away.

A stained fissure is revealed.

- Top up any fissure sealants as required if the child is still at increased caries risk.

Worn sealant in a child still assessed as at increased risk of caries. Exposed fissures are now carious. If the child has attended regularly, this is a failure of clinical care rather than the fissure sealant.

6 Caries Prevention

Using glass ionomer cement as a sealant material

Placing a resin sealant can be difficult on a partially erupted tooth, or with a child whose cooperation is limited. In these situations, a glass ionomer material can be used as a temporary measure, but the retention rates of this material are poor over the long term.

Partially erupted lower 6

- For children at increased risk of caries, consider the use of glass ionomer sealant material as a temporary measure only:
  - when the child is pre-cooperative, or
  - when resin sealant is indicated but there are concerns about moisture control[6], or
  - on a partially erupted tooth.
- For a child at increased risk of caries, but not yet able to tolerate the resin sealant procedure, consider placing glass ionomer sealants with the "press finger" technique.

Lower 6 to be sealed.

Place a small amount of glass ionomer on one finger tip, and Vaseline on the adjacent finger.

If possible, wipe the tooth surface with a cotton wool roll.
Firmly apply the finger tip with glass ionomer to the tooth surface to be sealed.
Keep finger in place for two minutes.

Place the second finger in the mouth, and rapidly switch fingers, to allow coverage of glass ionomer with Vaseline before moisture contamination.
In this example, Fuji Triage™ was used.

7 Management of Caries in Permanent Molars

Once an effective preventive programme has been initiated, it is then appropriate to implement a caries management plan, if required.

The primary dentition is transient, whereas the permanent dentition must last the child for life. As the teeth most vulnerable to decay in childhood and adolescence are the permanent molars[22], keeping them caries-free is a priority for dental care when developing a personal care plan for a child.

Caries most commonly develops at just two sites on permanent molars: at the base of pits and fissures, and on the approximal surfaces, just below the contact point. Both these sites present challenges to the clinician in terms of caries diagnosis, and caries management.

Children may present with first permanent molars (6s) with advanced caries. In addition, approximately 1 in 15 children will be affected by molar incisor hypomineralisation (MIH) to some degree. This condition, of unknown aetiology, can result in extensive breakdown of 6s. If a 6 is assessed as having a poor life-time prognosis, and the second permanent molar (7) is not yet erupted, then it may be in the child's long term best interest to extract the 6, allowing the 7 to erupt into its place.

- With a high index of suspicion for caries, thoroughly examine all first and second permanent molars (6s & 7s), focusing on the base of pits and fissures and the approximal surfaces just below the contact points.
- Manage suspicious fissures and early approximal lesions as described in Section 7.1 and 7.2.
- If a 6 is assessed as needing a restoration, consider temporising it until prevention is established and the child's cooperation is sufficient to cope with the planned treatment.
- When a child is in the mixed dentition, make an assessment of the long term prognosis of the 6s. If prognosis is poor, consider planned loss of the 6s (see Section 7.3).
- When restoring permanent teeth in children ensure this is done to the same high standard as for adults to maximize the longevity of restorations and to minimise the amount of treatment required later in life.

7 Management of Caries in Permanent Molars

7.1 Management of the Suspicious Fissure in a Permanent Molar

Aim: to ensure the optimum management of possible fissure caries in permanent molars.

Advantage	Disadvantage
• Appropriate management of early carious lesions may prevent the child entering the restorative cycle unnecessarily.	• If a sealing-in approach is adopted when managing a suspicious fissure, then careful long-term monitoring and repair of fissure sealants is essential.

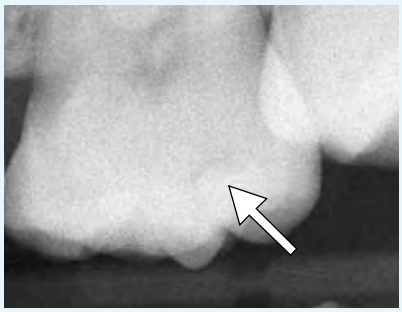
Technique

If there is uncertainty whether caries is present in an occlusal fissure, the appropriate procedure is as follows.

- Thoroughly clean the fissures of all debris, dry the tooth and view it with bright, direct light.
  - Drying allows any demineralisation in the enamel to be visualised, in the same way that etched enamel only appears frosty when completely dry.
- View a good-quality bitewing radiograph of the tooth (see Section 3.4.2).
- If there is either:

micro-cavitation **or** shadowing visible under enamel adjacent to fissure **or** dentinal caries clearly visible radiographically





then place a conventional composite restoration limited to the site of the carious lesion and fissure seal the remaining fissure system.

It is important to note that the two clinical examples shown above do not represent a failure of the fissure sealants; they represent a failure to monitor and repair existing sealants (possibly due to patient non-attendance or on the part of the dental team).

7 Management of Caries in Permanent Molars

- If the fissure is discoloured or stained but none of the above applies and caries is not clearly undermining the enamel, either visually or radiographically, then place a fissure sealant and review at every recall visit. Top up the sealant if it wears enough to expose fissures.
    - If early occlusal dentinal caries is inadvertently sealed in, provided the sealant is maintained, the caries is unlikely to progress.
- If the tooth is only partially erupted, or the child's cooperation is insufficient for placement of a resin fissure sealant or a restoration, consider the use of a glass ionomer material as a temporary sealant or restoration (see Section 6.5).
- Monitor for any caries progression using radiographs.

7.2 Management of the Enamel-only Approximal Lesion in a Permanent Molar

Aim: to reduce the risk of permanent molars requiring a Class II restoration.

Advantage	Disadvantage
• Avoids Class II restorations which are destructive of tooth tissue, and are challenging to place, both for the clinician and the child.	• As yet, no clinical studies in primary care have assessed the effectiveness of interventions in arresting or reversing enamel-only lesions on approximal surfaces.

Identification and appropriate management of an early proximal lesion may prevent the child entering the restorative cycle unnecessarily.

Approximal caries is particularly difficult to diagnose visually, and radiographic examination is recommended when this is suspected. Alternatively, orthodontic separators may be used, but this requires the child to re-attend after five days. Early diagnosis of lesions, before they cavitate, may allow them to be managed without operative intervention. However, cavitated approximal lesions should be managed with a restoration, as it will generally not be possible to alter the micro-environment of the lesion sufficiently to prevent it progressing.

If uncertain whether cavitated, a separator can be applied

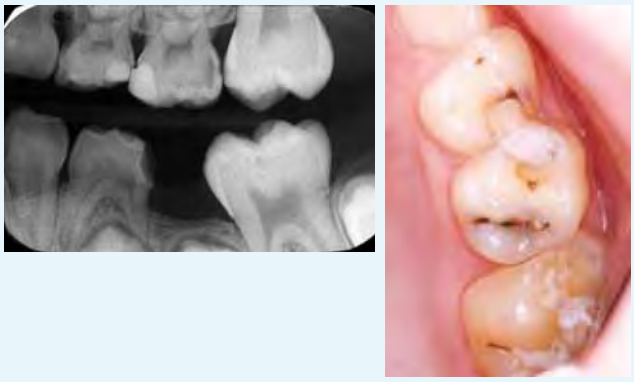
Separator removed 5 days later, allowing visualisation of the proximal surface

- Make it a priority to identify and arrest early enamel-only lesions on the mesial surface of 6s.

7 Management of Caries in Permanent Molars

Techniques

- Apply fluoride varnish, and monitor with bitewing radiographs.
- Ensure the parent/carers are fully aware of the potential impact on their child's oral health, and encourage them to floss, or use floss wands, on the 6/E contact 2–3 times a week (see Section 6.2).
- In addition, if the distal of the E has a Class II lesion, consider:
  - a Hall crown on the E or a restoration if not cavitated. If restoring, take extreme care not to cause iatrogenic damage to the mesial of the 6 when rotary instruments are used (see Section 9.3)
  - a slice preparation of the E if cavitated (Section 8.4), taking extreme care not to cause iatrogenic damage to the mesial of the 6 when rotary instruments are used (see Section 9.3)
  - extraction of the E.



Early approximal enamel lesion on upper left 6

7.3 Planned Loss of First Permanent Molars of Poor Prognosis

Aim: To ensure that the opportunity is not missed to extract first permanent molars (6s) of poor prognosis at the optimum time to enable second permanent molars to occupy their spaces.

Advantage	Disadvantage
• In some situations, extraction of 6s of poor long-term prognosis at the correct time can allow the development of a caries free dentition in the adolescent, without spacing.	• Requires extraction of permanent molar teeth from young children, which is demanding for the child, and which may necessitate general anaesthesia, with associated risks.

7 Management of Caries in Permanent Molars

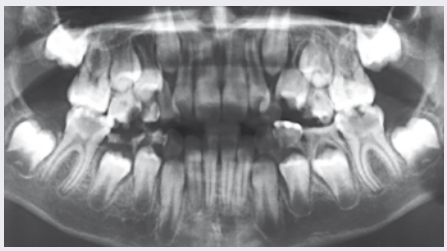
Extraction of first permanent molars of poor prognosis at around 9 years of age can allow the second permanent molars (7s) to erupt into an acceptable occlusion with the second premolars. Molars of poor prognosis include those that have:

- an advanced occlusal lesion, or an approximal lesion
- hypomineralisation that has caused breakdown and cavitation of enamel
- lingual decalcification, with cavitation

When carrying out extractions of 6s, the optimal occlusal result will be obtained when:

- bifurcation of the lower 7 is seen to be forming on a full mouth panoramic radiograph, usually around the age of 8½–10 years
- 5s and 8s are all present on a full mouth panoramic radiograph
- mild buccal segment crowding is present
- class I incisor relationship is present

Molar with advanced occlusal lesion



Radiograph showing bifurcation of lower 7s forming

When deciding on extractions, each first permanent molar should be considered on its own merit. It is not necessary to balance extractions (extraction of the contralateral tooth), and evidence supporting the benefit of compensating extractions (extraction of the same tooth in the opposing arch) is weak. The Royal College of Surgeons of England guidance provides more detailed advice on planned extraction of first permanent molars[23].

- Assess whether 6s are of poor prognosis.
- Obtain a good quality full mouth panoramic radiograph to ensure that all teeth are present, in good condition and are well placed for eruption before extracting any first permanent molars.
- With the possible exception of the third permanent molars, if any of the remaining permanent teeth are missing (hypodontia), poorly placed, have hypomineralisation or there is significant skeletal discrepancy, refer for specialist paediatric or orthodontic opinion before undertaking extractions.
- If there is pain or sepsis and the child accepts local anaesthesia, if necessary, consider extraction of the affected tooth only before referring for specialist paediatric or orthodontic opinion.
- If necessary, consider temporising first permanent molars of poor prognosis in young children, possibly using preformed metal crowns, to keep them free from symptoms until the optimal age for extractions is reached.
- If in doubt at any stage, temporise the teeth, continue prevention and refer the child for specialist paediatric or orthodontic opinion (see Section 11).

8 Management of Caries in Primary Teeth

After initiating preventive interventions and planning management of any caries in permanent teeth, the clinician's next priority is to reduce the risk of any caries in the primary dentition causing the child pain or sepsis. This is best achieved using a caries management strategy that avoids upsetting the child and causing treatment-induced anxiety.

In addition to traditional restorative procedures, there is increasing evidence that alternative approaches based on altering the environment of the plaque biofilm can be effective in managing caries in the primary and permanent dentition. Consequently, there are five principle management strategies available to the dentist when managing caries in the primary dentition:

- complete caries removal, and restoration (Section 8.1)
- partial caries removal, and restoration (Section 8.2)
- no caries removal, seal with restoration (Section 8.3)
- no caries removal, provide prevention alone or after first making the lesion self-cleansing (Section 8.4)
- extraction, or review with extraction if pain or sepsis develops (Section 8.5)

The ranges of lesions for which these strategies can be considered are illustrated in Table 1 (page 44). There will usually be more than one treatment strategy for each lesion but the dentist must use clinical judgement to select the most appropriate option for each clinical situation. The flowchart in Figure 4 is designed to assist in making decisions about management options. It is essential that every carious lesion has some active management.

In addition to the treatment strategies outlined above, the Atraumatic Restorative Technique is a method of cavity preparation that does not require the dental handpiece or local anaesthetic and hence should be considered when treating anxious children (see Section 9.2). As there is a risk of iatrogenic damage to adjacent teeth when preparing Class II cavities, advice on how to avoid this is provided in Section 9.3.

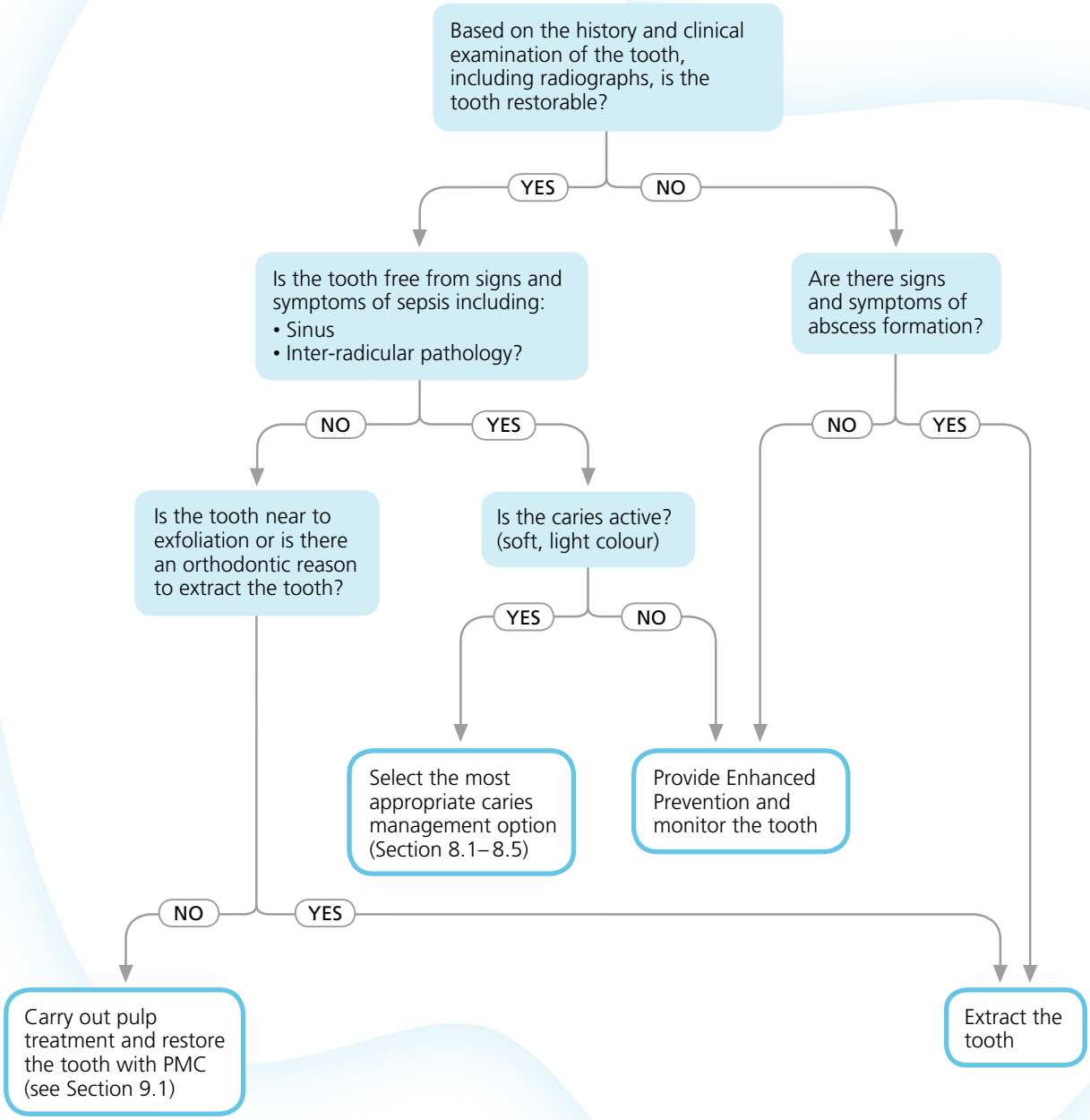
- Taking all relevant factors into account, establish which treatment options are appropriate and which you believe are the most suitable for the patient.
- Avoid operative interventions involving local anaesthetic until the child can cope.
- Discuss and agree the proposed technique with the parent/carer and, if possible, the child.
- Obtain informed consent from the child or their parent/carer depending on the age of the child.
- Carry out the treatment.
  - Sections 8.1–8.5 provide further information about each technique.
  - Section 10 provides further information about helping children accept treatment.
- Manage a primary tooth which is associated with sepsis (signs or symptoms of abscess, sinus, inter radicular radiolucency, non-physiological mobility) with either a pulp therapy (see Section 9.1) or extraction (see Section 8.5). **Do not leave sepsis untreated.**
- Consider using the Atraumatic Restorative Technique for caries removal, if appropriate (see Section 9.2).

8 Management of Caries in Primary Teeth

- Avoid iatrogenic damage to the approximal surface of the adjacent tooth when preparing Class II cavities (see Section 9.3).
- **Do not leave active caries in primary teeth unmanaged.**

Figure 4 Decision-making for managing the carious primary tooth

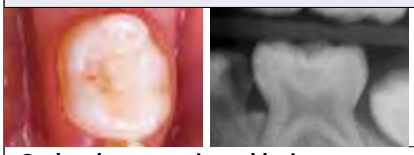
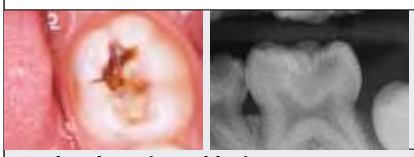
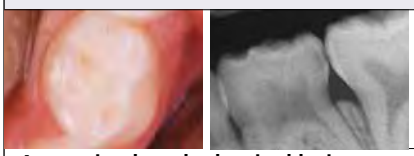
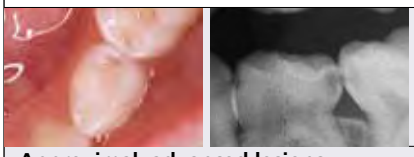
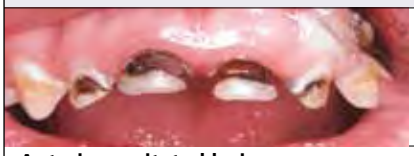
This flow diagram illustrates the key decision-making processes involved in forming an appropriate caries management plan that takes into account the factors that influence treatment provision.



8 Management of Caries in Primary Teeth

Table 1 Management Options for Carious Lesions in Primary Teeth

For each type of lesions shown, when there are no clinical or radiographic signs of pulpal involvement, the possible treatment options are indicated. Further details on each caries treatment technique are provided in Sections 8.1–8.5.

	Complete caries removal and restoration	Partial caries removal and restoration	No caries removal, seal caries with fissure sealant	No caries removal, seal caries with Hall crown	No caries removal, provide prevention alone	No caries removal, make lesion self-cleansing and provide prevention	Extraction or review, with extraction if pain or sepsis develops
	Section 8.1	Section 8.2	Section 8.3	Section 8.3	Section 8.4	Section 8.4	Section 8.5
 **Occlusal, non-cavitated lesions**	✓	✓	✓		✓*		
 **Occlusal, cavitated lesions**	✓	✓		✓	✓*	✓*	
 **Approximal, early dentinal lesions**	✓	✓		✓	✓*		
 **Approximal, advanced lesions**	✓	✓		✓	✓*	✓*	
 **Anterior cavitated lesions**	✓	✓			✓		
 **Grossly carious unrestorable tooth, without signs or symptoms of pain or sepsis**					✓		✓

* due to a lack of supporting evidence, these approaches are only appropriate for these types of lesions if no alternative is feasible. Document the use of these approaches in the patient's record.

8 Management of Caries in Primary Teeth

8.1 Complete Caries Removal and Restoration

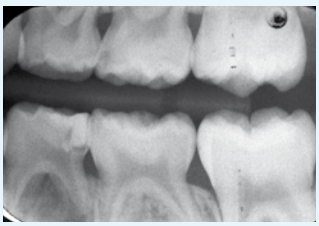
Aim: to remove all infected carious tooth tissue, and restore the tooth to function.

Advantages	Disadvantages
• Evidence, largely from secondary care and private practice, that this approach can be effective[7].	• Some evidence that this approach is not effective in general dental practice in the UK[7].
• Currently accepted as best practice by British Society for Paediatric Dentistry[24].	• Can be demanding of both the child and the dentist, as this involves use of local anaesthesia and high speed handpieces and requires good moisture control.

Technique for plastic restorative material

Example shown: restoration of a mesial cavity, upper left E.

- Give local anaesthetic before commencing cavity preparation as this will require sound dentine to be cut.



- Gain access to caries using a high-speed handpiece, leaving a wall of enamel to protect the adjacent tooth.

- Remove caries with a slow-speed handpiece and excavators.
  - Be aware of pulp chamber anatomy to reduce the risk of pulpal exposure.

- Prepare approximal cavity margins with gingival margin trimmers to prevent iatrogenic damage to the adjacent tooth.

8 Management of Caries in Primary Teeth

- Place the restoration.
  - If at risk of pulpal exposure, place an indirect pulp cap.
  - Do not use conventional glass ionomer materials for restoration of a Class II cavity due to the unacceptably high failure rate. Composite, compomer, resin modified glass ionomer, amalgam and preformed metal crowns may be suitable, the particular material choice depending on the cavity.

Traditional technique for preformed metal crowns

- Give local anaesthetic.
- Remove caries.
  - If at risk of pulpal exposure, place an indirect pulp cap (molar shown has had a pulp therapy).

- Cut a mesial slice and a distal slice. The bur should pass through the crown cervically in order to avoid creation of a cervical ledge, as this will impede the seating of the crown.
  - Note how a wall of enamel is left while cutting the slice to ensure there is no iatrogenic damage to the adjacent tooth. The wall will then fall away as the cut is completed cervically.

- Reduce the occlusal surface of the tooth enough to allow a straight probe to be passed across the tooth surface when the teeth are in occlusion.

- Select the correct size of preformed metal crown (PMC), cement the PMC in place with glass ionomer cement, remove excess cement and clear contacts using floss.

8 Management of Caries in Primary Teeth

8.2 Partial Caries Removal and Restoration

Aim: to remove sufficient carious tooth tissue to enable an effective marginal seal to be obtained with a bonded adhesive restorative material, and thus inhibit further progression of residual caries.

Advantages	Disadvantages
• Evidence, largely from secondary care and private practice, that this approach can be effective[25].	• As caries is left in the cavity, the marginal seal must be effective to prevent caries progression.
• Reduced risk of pulpal exposure.	• No evidence, as yet, that this approach is effective in Primary Care.
• Reduced time for cavity preparation, and less need for local anaesthesia.	
• Particularly suited to ART approach.	

As it is imperative to obtain a complete marginal seal to slow or arrest caries progression, the use of plastic adhesive materials is likely to be most successful on Class I lesions, with preformed metal crowns being the preferred option for Class II lesions.

Technique for primary molars

- If necessary, gain access to caries using a high-speed handpiece.
  - As this approach rarely requires the cutting of sound dentine, local anaesthetic is usually unnecessary.

- Remove superficial caries with a slow-speed handpiece or excavators, until there is no obvious caries visible at the enamel-dentine junction and the cavity allows an adequate thickness of restorative material to be placed.
  - Take extra care not to cause iatrogenic damage to adjacent teeth if cutting a Class II cavity (see Section 9.3). Placing a matrix band around the adjacent tooth may help.
  - Be aware of the pulp chamber anatomy to reduce the risk of pulpal exposure.

8 Management of Caries in Primary Teeth

- Place the restoration, using adhesive material and a bonding system. Do not use glass ionomer materials for restoration of a Class II cavity.
- Fissure seal the tooth surface and as many of the restoration margins as possible.
- Monitor for any caries progression using radiographs where appropriate.
- Inform the child and parent/carer of the approach taken and record details in the patient's notes.

Technique for primary incisors

- Thoroughly clean the teeth with prophylaxis paste.
  - Caries removal will be minimal so local anaesthesia is not required.
- Acid etch the entire crown; wash, dry and apply a bonding system.

As and Bs managed by partial caries removal and restoration

- Place the composite restoration, either by handbuilding or using strip crowns.
- Inform the child and parent/carer of the approach taken and record details in the patient's notes.

8 Management of Caries in Primary Teeth

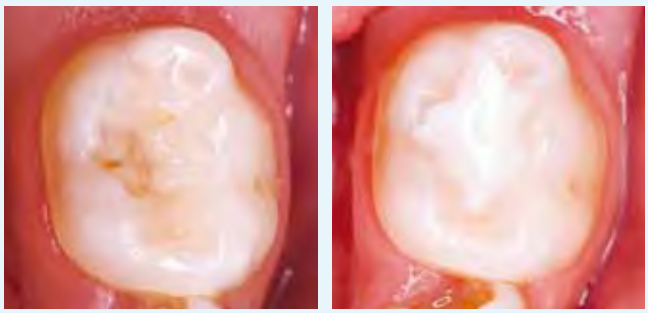
8.3 No Caries Removal, Seal With Restoration (including Hall Technique)

Aim: to completely seal a carious lesion from the oral environment so that the environment of the plaque biofilm is altered sufficiently to slow or even arrest caries progression.

Advantages	Disadvantages
• Evidence, including some research from Primary Care, that this approach can be effective, and is preferred to complete caries removal techniques by children, their parent/carer and dentists[25,26]. • Avoids need for local anaesthesia, and tooth preparation. • No risk of iatrogenic damage to adjacent teeth.	• Dependent on the quality of the seal for success. If the seal fails, the caries will progress. • Further clinical trials in Primary Care needed to consolidate evidence base.

Technique using fissure sealant

- Place a fissure sealant over non-cavitated pit or fissure caries, to completely seal the fissure system.
- If using this approach on a pre-cooperative child, consider using the press finger technique with a glass ionomer material as a temporary measure (see Section 6.5).



Non-cavitated caries before and after fissure sealing

Aftercare

- Check the integrity of the sealant with a probe at each recall visit.
- Use radiography to monitor if the lesion is progressing at intervals informed by caries risk assessment.
- When a fissure sealant that has been applied over a carious lesion has worn enough to expose some parts of the fissure system, apply a fresh fissure sealant.
- Inform the child and parent/carer of the approach taken and record details in the patient's notes.

8 Management of Caries in Primary Teeth

Hall Technique using preformed metal crowns

This technique involves sealing caries into primary molars with a preformed metal crown (PMC). No local anaesthesia, tooth preparation or caries removal is used.

The Hall Technique: caries in a lower E sealed in with a PMC

Only an outline of the technique is given below. Before using it, refer to the Hall Technique User's Manual available at www.scottishdental.org/?record=31.

Early detection of Class II lesions with radiographs before there is marginal ridge breakdown will facilitate their management with the Hall Technique, because PMCs can be more difficult to satisfactorily fit if the mesio-distal width has been reduced as a result of mesial migration of the tooth behind.

Outline of Technique

- Ensure the child is sitting upright.
- Assess whether separators are required.
    - Placing separators requires a second visit 3-5 days later to remove them and to fit the crown, but some clinicians find they ease the fitting of a Hall crown.
- If there is any possibility of the crown endangering the airway during fitting, make a 'handle' for it with a strip of sticking plaster, or ensure the airway is protected with gauze.
- Select the correct size of PMC.
    - Do not seat the crown through contacts prior to cementation, as it might be difficult to remove.
- Ensure the PMC is well filled with a glass ionomer luting cement.
- Seat the PMC over tooth.
    - Seating can be assisted by the child biting on the crown, or on a cotton wool roll placed on the crown.
- Remove excess cement and clear the contacts using floss.
- Ensure excess cement does not flood over the tongue because it has a very bitter taste that children dislike.

8 Management of Caries in Primary Teeth

8.4 No Caries Removal, Prevention With or Without Self-cleansing

Aim: to reduce the cariogenic potential of the lesion by altering the environment of the plaque biofilm overlying the carious lesion through brushing and dietary advice. Making the lesion self-cleansing by slice preparation may aid plaque control.

Advantages	Disadvantages
• The absence of operative intervention (unless the lesion must be shaped to make it self-cleansing) makes this approach acceptable to children.	• As yet, there is no evidence base that this approach is effective. • Very reliant on parent/carer and child changing their oral health behaviours.

Technique for prevention alone

- Show the parent/carer and the child the carious lesion.
- Provide Enhanced Prevention as described in Section 6, with particular emphasis on effective brushing of the lesion (e.g. to brush a Class II lesion may require the brush to be moved laterally).
- Keep a record of the size, colour and consistency of the lesion to enable monitoring and an alteration of the treatment plan if the lesion does not arrest.
- Consider recording caries progression via radiographs, photography or ICDAS (see SDCEP *'Guidance on Comprehensive Oral Health Assessment'*[8] for further details).
- Assess for the presence or absence of plaque biofilm on the surface of the lesion at each visit (consider recording plaque scores). If the child, or parent/carer cannot keep the lesion free from plaque, consider an alternative management strategy.
- Ensure the parent/carer is made fully aware of their responsibility. If caries progresses, choose another option.
- Consider whether making the lesion self-cleansing would aid plaque control.
- Inform the child and parent/carer of the approach taken and record details in the patient's notes.

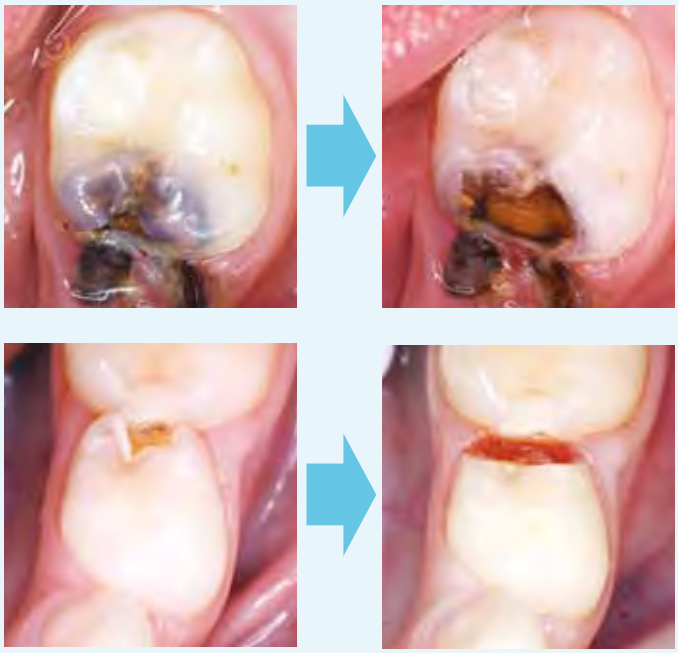
This carious lower E has been managed with a prevention alone strategy. This has not been successful as plaque is visible four months later and the caries appears active rather than dark, hard and inactive (arrested). Therefore, a more restorative-based approach is now required.

8 Management of Caries in Primary Teeth

Technique for making a lesion self-cleansing

As only enamel and carious dentine are removed, the use of a local anaesthetic should not be necessary unless subgingival tooth preparation is required.

- Using a high-speed handpiece, or hand instruments, remove undermined enamel adjacent to the carious lesion making the surface of the lesion accessible to toothbrushing.
    - The resulting cavity form will vary in shape depending on the lesion. It might be opening out of an occlusal lesion or result in a 'slice preparation', as shown in these photographs.



- Apply fluoride varnish.
- Inform the child and parent/carer of the approach taken and record details in the patient's notes.

8 Management of Caries in Primary Teeth

8.5 Extraction of Primary Teeth

For primary teeth with associated pain or sepsis and when alternative management options have been excluded, the option of extraction needs to be considered. Dental extractions with local anaesthesia are potentially traumatic for the child and can leave them with a negative perception of dental care. They are to be avoided if at all possible until the child is able to cope with the procedure.

- Avoid dental extractions with local anaesthesia on a child's first visit if at all possible.
- If the child is in pain, consider dressing the tooth with corticosteroid-antibiotic paste and a temporary dressing (if pulpitis), or a course of antibiotics (if dental abscess) and delaying extraction until the child is able to cope.

8.5.1 Balancing Extractions in the Primary Dentition

A balancing extraction is the extraction of a contralateral tooth, performed in order to minimise centre-line shift and maintain symmetry of the developing occlusion. Over the last decade however, orthodontic treatment has moved away from techniques based on extraction of premolars and the use of removable appliances to the use of fixed appliance therapy, with less reliance on extractions. Therefore, there can be more flexibility in the guidance on the indications for balancing extractions, the benefits of which have to be weighed against the risk of causing treatment-induced anxiety through the additional extraction[27].

- Consider balancing extractions when:
  - one C is to be extracted due to dental disease
  - one C has exfoliated prematurely due to eruption of the permanent lateral incisor
  - centre-line shift is developing following extraction of one D

Balancing extractions are not usually necessary in the following situations:

- loss of primary incisors
- loss of Ds unless a centre-line shift is developing
- loss of Es

- If in doubt arrange an orthodontic assessment.

Note that if caries is identified on one side of the mouth it is quite likely to also be present on the other side and, therefore, it is particularly important to examine contralateral teeth for disease with bitewing radiographs, if indicated.

9 Additional Techniques

9.1 Pulp Therapy for Primary Molars

For the child with caries-related dental pain or sepsis (sinus or abscess), the clinician has to decide whether a pulp therapy is required and if so, whether this should be a vital, or a non-vital pulp therapy. A flow diagram that illustrates diagnosis and appropriate treatment options in shown in Figure 3.

Aim: to enable a primary molar with pulpal disease to be retained free from pain and sepsis until exfoliation.

Advantages	Disadvantages
• Evidence, largely from secondary care and private practice, that these approaches can be effective[7]. • Can avoid dental extractions.	• Techniques can be demanding both for the child and the clinician as they require local anaesthesia and immediate placement of a preformed metal crown (PMC) to maximise effectiveness.

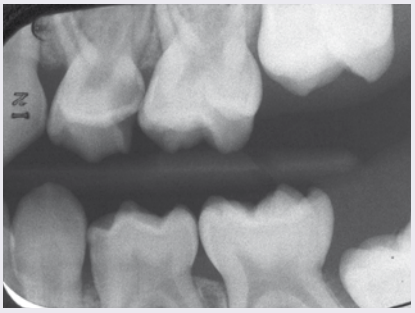
Indications	Contra-Indications
• Irreversible pulpitis (vital pulp therapy) • Dental abscess/non-vital pulp (non-vital pulp therapy) • Radiographic signs of pulpal involvement	• Tooth close to exfoliation • Tooth unrestorable • Pre-cooperative child • Multiple pulp therapies needed

There is currently debate about the indications for pulp therapy when a primary molar is asymptomatic. A fractured marginal ridge alone is not necessarily an indication. When a narrow band of 'normal' dentine can be seen on radiographs between a carious lesion and the dental pulp and when the tooth is otherwise free from clinical and radiographic signs of pulpal disease, a pragmatic approach is to manage the tooth without a pulp therapy (refer to Table 1, page 44) and to monitor at subsequent visits.

As roots of primary teeth resorb, conventional endodontics is contra-indicated. Instead, removal of irreversibly diseased pulp tissue from the pulp chamber alone, followed by placement of a preformed metal crown (PMC) to achieve a good coronal seal can resolve symptoms.

9 Additional Techniques

Clinical view



Radiographic view

Pulp morphology of upper D

Perforated pulp chamber floor

Symptomatic upper left D in a 5-year-old which requires pulp therapy

Note from the radiograph and model:

- how much higher the pulp horns are relative to the central part of the pulp chamber roof in primary molars;
- how divergent the root canals are when leaving the pulp chamber.

Care is needed to avoid perforating the floor of the pulp chamber, which is very thin in primary molars (photo on right).

The choice of pulp therapy technique will depend on whether the pulp is found to be vital or non-vital once accessed.

9.1.1 Vital Pulp Therapy

Example shown: pulp therapy of a symptomatic upper left D in a 5 year old

- Give local anaesthetic.
- Cut a large access cavity using a high speed handpiece, ensuring the entire roof of the chamber is cleared.
- Remove the contents of the pulp chamber using a slow-speed handpiece, or sharp excavator.

9 Additional Techniques

- Thoroughly irrigate the pulp chamber with water from the 3-in-1 syringe.
  - Avoid the use of compressed air, which could cause surgical emphysema.
- Identify entrances to root canals, which will be in the corners of the pulp chamber.
  - Maxillary primary molars have three canals (two buccal and one palatal).
  - Mandibular primary molars have just two canals (mesial and distal).
- If still bleeding, arrest haemorrhage by placing a pledget of cotton wool dampened in ferric sulphate into the pulp chamber, place another pledget on top, and then have the child bite on a cotton wool roll placed over the tooth for ~2 minutes.
  - Use of formocresol is not recommended due to concerns about its safety[7].


- If haemorrhage cannot be arrested, consider sealing in ferric sulphate in cotton wool until the next visit.
- Remove the cotton wool and place zinc oxide-eugenol cement in the pulp chamber. Alternatively, setting calcium hydroxide cement or MTA may first be placed on pulp stumps and the floor of the pulp chamber[28].


- Fill the cavity with zinc oxide-eugenol cement, then place a PMC following a conventional preparation (see Section 8.1) at the same appointment.
  - There is evidence that placing a PMC at the same appointment as the pulpotomy improves the prognosis of the tooth[29-33].


Aftercare

- Advise the parent/carer that the tooth might be a little uncomfortable for the child when the anaesthetic wears off, and that the child may need analgesia.
- Conduct a radiographic review of pulpotomised primary molars annually.

9 Additional Techniques

9.1.2 Non-vital Pulp Therapy

Example shown: pulp therapy of a lower E in a 6-year-old.

- Give local anaesthetic.
- Cut a large access cavity using a high speed handpiece, ensuring the entire roof of the chamber is cleared.

- Remove the contents of the pulp chamber using a slow-speed handpiece, or sharp excavator, and remove as much necrotic tissue as is possible from the entrance to the root canals, using a straight probe.
- Thoroughly irrigate the pulp chamber with water from the 3-in-1 syringe.
  - Avoid the use of compressed air, which could cause surgical emphysema.
  - Consider gentle irrigation of root canals using local anaesthetic solution. To facilitate access, use a needle that has been bent with tweezers.

- Dry pulp chamber with cotton wool. Place calcium hydroxide paste in coronal section of canals, using either an applicator, or a probe. Alternatively, use a mix of plain zinc oxide-eugenol.

- Back fill with zinc oxide-eugenol paste, applied with firm pressure, then at the same appointment, place a conventional PMC.
- If the tooth remains symptomatic, or a sinus is still present after three months, extract the tooth.

If the child will accept the placement of rubber dam, clinicians could consider a pulpectomy procedure, where endodontic files and irrigation are used to clean the canals before filling them with a mix of plain zinc oxide-eugenol cement. Further information on this specialist technique is available[34].

9 Additional Techniques

9.2 Atraumatic Restorative Technique (ART)

Aim: To prepare cavities in a manner that is less stressful for the child than conventional techniques.

Advantages	Disadvantages
• Evidence that children find cavity preparation with ART less stressful than conventional preparation[7]. • Cavity preparation using ART may be advantageous where child behavioural management is an issue.	• Requires the use of very sharp hand instruments and is a very exacting technique for the clinician.

ART was developed for cavity preparation using hand instruments only, without local anaesthesia, in developing countries where there was no access to power. Children perceive cavity preparation with ART to be less stressful than conventional techniques, so dentists might consider using ART to prepare cavities. Unfortunately, ART has become synonymous with use of glass ionomer cement as the restorative material (as it is the only material which can safely be hand mixed, and is also self curing). However, while glass ionomer is satisfactory for use in Class I cavities, it has significant limitations in Class II cavities. Therefore, conventional glass ionomer should not be used when restoring Class II cavities. Instead, composite, compomer, amalgam or resin-modified glass ionomer cement can be used[7].

Technique

The technique relies on the use of very sharp hand instruments: enamel chisels to cleave off unsupported enamel, and then excavators to remove carious dentine.

Excavator and enamel margin trimmer

Using a sharpening stone to sharpen instruments

Excavator sharp enough to cut paper

9 Additional Techniques

- Ensure excavators and enamel chisels/gingival margin trimmers are kept sharp.
- Use sharp enamel chisels to cleave off unsupported enamel, enabling access to carious dentine.
- Advise the child that this part will sound "scratchy", or "picky".
- Use a firm finger rest.
- Pare off carious dentine by cutting across the line of the dentinal tubules.
    - This will minimise pain during instrumentation of carious dentine, which occurs when pressure is applied in a pulpal direction causing an increase in fluid pressure in patent tubules beneath the lesion which is then transmitted to the pulp.
- Restore the cavity with an adhesive material.
    - Do not use glass ionomer materials for restoration of a Class II cavity due to the unacceptably high failure rate.
- Inform the child and parent/carer of the approach taken and record details in the patient's notes.

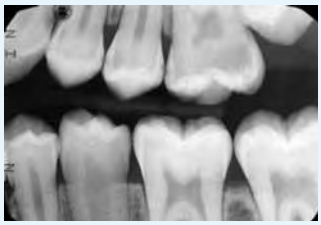
9 Additional Techniques

9.3 Avoiding Iatrogenic Damage when Preparing Class II Restorations

When preparing Class II cavities, iatrogenic damage to the approximal surface of the adjacent tooth is common. This damage has been shown to occur in up to 60% of Class II preparations and is associated with a significantly increased risk of subsequent caries development[7]. To reduce the risk, a matrix band can be placed around the adjacent tooth prior to cavity preparation or the enamel margins of the box can be prepared with hand instruments alone, as shown below.

Technique

Example shown: Class II cavity preparation for a mesial cavity on an upper left 5, with gingival margin trimmers alone being used to prepare the box.



- Access cavity prepared with a high-speed handpiece, leaving the approximal wall of enamel intact.

- Remove caries using a slow-speed handpiece.

- Prepare approximal cavity margins using gingival margin trimmers only.

- Complete the restoration.

10 Helping Children Accept Care

The greatest challenge to most dentists when treating children is in managing the child to ensure a pain-free positive experience for the child whilst carrying out efficient good quality dentistry. Therefore, knowledge and use of effective behavioural management techniques are important. Local anaesthesia is often the part of dental treatment that children are most fearful about, and administering local anaesthesia to them can be demanding. Use of the following techniques can help children accept treatment and enable a stress-free experience for the child and dentist.

10.1 Local Anaesthesia

Local anaesthesia (LA) is recommended for any cavity preparation that involves cutting sound dentine in both primary and permanent teeth. Dentine in primary teeth is as sensitive as that of permanent teeth. LA can be used successfully in children as young as 4 years old. Infiltrations are effective for most treatments on primary teeth, including extractions. However when carrying out pulpotomies on lower Es, an inferior dental block (IDB) has been found to be more effective.

Most children will be apprehensive about receiving local anaesthesia. However, the use of "sleight of hand" techniques when giving LA may lead to "mistrust" phobias, which may be difficult to resolve at a later time.

- Ask the child if they want to see what you would like to use to make their tooth (and not them!) go to sleep. If they say yes, then show them the syringe, emphasising how fine the needle is (like a cat's whisker), and that only a tiny part of it will go into their gum.
- To reduce the discomfort of local anaesthesia use:
  - topical anaesthesia
  - a very slow injection technique, taking at least 60 seconds for an infiltration
  - intra-papillary injections rather than palatal injections (see below).

10 Helping Children Accept Care

10.1.1 Intra-papillary Injection Technique

Intra-papillary injections are useful for achieving palatal or lingual anaesthesia without any discomfort. However, it does take several minutes to complete.

- Apply topical anaesthesia.
- Give a buccal infiltration injection adjacent to the tooth you want to anaesthetise.
- Draw an imaginary line across the base of one of the interdental papilla, and drop a perpendicular down onto the line. Where the lines intersect, insert the needle horizontally, so as to pass between the teeth on either side.
- Advance the needle 1-2 mm and gently inject a drop or two of LA solution. Ensure the needle remains in the correct plane, so as to neither obstruct on the interseptal bone, nor emerge into the interdental col.
- Advance another 1-2 mm, and inject another drop of LA solution.
- Continue to do this, while observing the palatal aspect of the mucosa in your mirror.
- After blanching is seen, withdraw the needle and insert it into the blanched area on the palatal side. The child will not feel this, and the needle may then be advanced further apically, if necessary, until complete anaesthesia is achieved.

10.2 Behavioural Management

There are several behavioural management techniques that can prove helpful when delivering dental care[35]. Gaining rapport with the patient is essential for all patients and is discussed in Section 3.1. Giving control and providing advice on how to relax will also benefit most children and these are outlined in Sections 10.2.1 and 10.2.2. Relaxation, coupled with gaining rapport and giving control, plus plenty of reassurance and praise, will help the majority of children accept most treatments.

Several additional techniques are described in Section 10.2.3.

10 Helping Children Accept Care

10.2.1 Control

Saying to a child "Let me know if you want me to stop" is not adequate to give them control. Giving control means making sure the child understands that they decide whether treatment continues or not, and rehearsing a signal to stop, such as raising their hand.

- If the child gives the signal, then stop treatment immediately.
  - If you do not stop treatment, the child may develop mistrust phobia which can be very difficult to resolve.

10.2.2 Relaxation

Telling a child to relax will not help them to relax but showing them how to breathe deeply using their diaphragm can.

- Ask the child to place a hand on their tummy.
- Ask them to breath in slowly and deeply, making the air "fill their tummy".
- Watch to see if their tummy rises; if so, praise them, and ask them to release their breath slowly, telling them that as they breathe slowly out, so they will become more relaxed.
- Ask them to do this three times, any time they feel tense and worried.

10 Helping Children Accept Care

10.2.3 Other Behavioural Management Techniques

Tell, Show, Do

Explain to the child what you are going to do, and then show them, before continuing with the treatment. The following example demonstrates how to encourage an apprehensive 5-year-old child to accept treatment that involves use of a high-speed handpiece for the first time.

- Gain rapport (see Section 3.1).
- Give control (see Section 10.2.1).
- Tell the child what you would like to do, and show them the handpiece (tell-show-do).
- Show them the high-volume aspirator and ask them if it would be alright to try it.
- If they agree, ask the nurse to put the aspirator tip into the child's mouth, switch it on, then off and then remove it.
- Ask the child if that was OK.
- Tell the child you would like to put the handpiece in their mouth ('Mr Whizzy', or whatever your favoured term is), switch it on, count to 4 (structured time, see below) then remove it. You will not touch their tooth. Ask the child if this would be OK.
- If the child agrees, then proceed as above. If the child is happy, tell them you would now like to touch the tooth and ask if that is OK.
- Continue using this technique for each new action.

Although this approach can appear laboured, after a child has accepted the procedure, it is usually not necessary to work through all the stages at subsequent visits. A child who has a profound needle phobia will need an enhanced version as described below.

Systematic desensitisation

Systematic desensitisation can be a very powerful technique for helping a child cope with dental treatment, if applied correctly. It involves teaching the child how to relax because it is not physiologically possible to be both anxious and relaxed at the same time. In its simplest form, the procedure is broken down into stages, and the child is taught to relax at each stage before moving on to the next with positive reinforcement.

A common application in dentistry is systematic needle desensitisation which is used to manage needle phobia. Only an outline is given here. For further details refer to *'Child Taming: How to Manage Children in Dental Practice'*[35].

- Discuss with the child how to recognise the signs of stress and anxiety that they may be experiencing (e.g. hyperventilation, tension).
- Teach the child how to manage their anxiety, principally with breathing (see Section 10.2.2) but also using progressive muscle relaxation and other techniques such as guided imagery.

10 Helping Children Accept Care

- Teach the child how to describe their level of anxiety, using a scale from 1 to 10 (where 1 is completely relaxed, and 10 is the most anxious they have ever been).
- Break the procedure down into stages, and describe all the stages to the child.
- Give control, then try the first stage, asking the child at the end of it to describe their anxiety level. If rated above 5, ask them to spend a minute going through their relaxation regime, and try again, only proceeding to the next stage when: (1) the child has reduced their anxiety to a manageable level; and (2) the child has given their permission to proceed.

Giving local anaesthesia could, for example, be broken down into holding the syringe by the side of the chair, placing it in the child's mouth but with the cap on, then holding the syringe in the child's mouth with the cap off, and so on.

Structured time

Children can tolerate some potentially upsetting procedures (such as use of a slow handpiece) if they know it will only continue for a finite period of time. "Just a little bit more" for a child could mean anything from a second or two, to eternity. Instead:

- Break down time into units the child can understand.
    - For example; "I'll buzz your tooth while I count to three, then stop; is that OK? Good, 1…..2…..3; Well done! And again, 1….2….3 etc".

Note that young children (up to 5 years old) may not understand the concept of numbers above 4, despite being able to recite them.

Despite attempts with the above techniques, if a child continues to demonstrate significant anxiety, referral to a specialist might be necessary.

- If referring to a specialist, include in your referral letter details of treatments that have been attempted and how successful each was found to be (see Section 11 for Referral Letter Checklist).

10 Helping Children Accept Care

10.3 Referral for Inhalation Sedation and General Anaesthesia

The use of behavioural management techniques and good clinical judgement regarding selection of appropriate treatment options will enable most children to complete a planned course of care. However, some children will have difficulty accepting dental treatment without sedation (either inhalation sedation for young children or intravenous sedation for older children) or general anaesthesia (GA).

Inhalation sedation is a safe and effective form of sedation that is usually only available in the Community and Salaried Dental Services or Hospital Dental Service. It is useful for children aged 5 years or older, but is of limited effectiveness for pre-school children. Intravenous sedation may be useful for teenagers. All forms of sedation can only be provided by clinicians who have undertaken appropriate postgraduate training.

Compared with inhalation sedation, GA carries an increased morbidity, and a mortality rate of approximately 1:250,000. In view of this, it is generally recommended that GA is only used after inhalation sedation has been tried and found to be ineffective. However, GA may be the best management option for pre-school children (<5 years of age), young school children who need multiple extractions in several quadrants, or for other potentially traumatic procedures. A meeting of GA providers in Scotland in 2003 agreed that the use of GA was a reasonable first option for 9 or 10 year-old children requiring extraction of all first permanent molars (unpublished).

The final decision about whether inhalation sedation or general anaesthesia is justified for dental care, and the planning of the dental care to be provided in this way, must be made by an appropriately experienced clinician.

The flowchart in Figure 5 may be helpful in deciding whether or not to refer a child for treatment under sedation or GA.

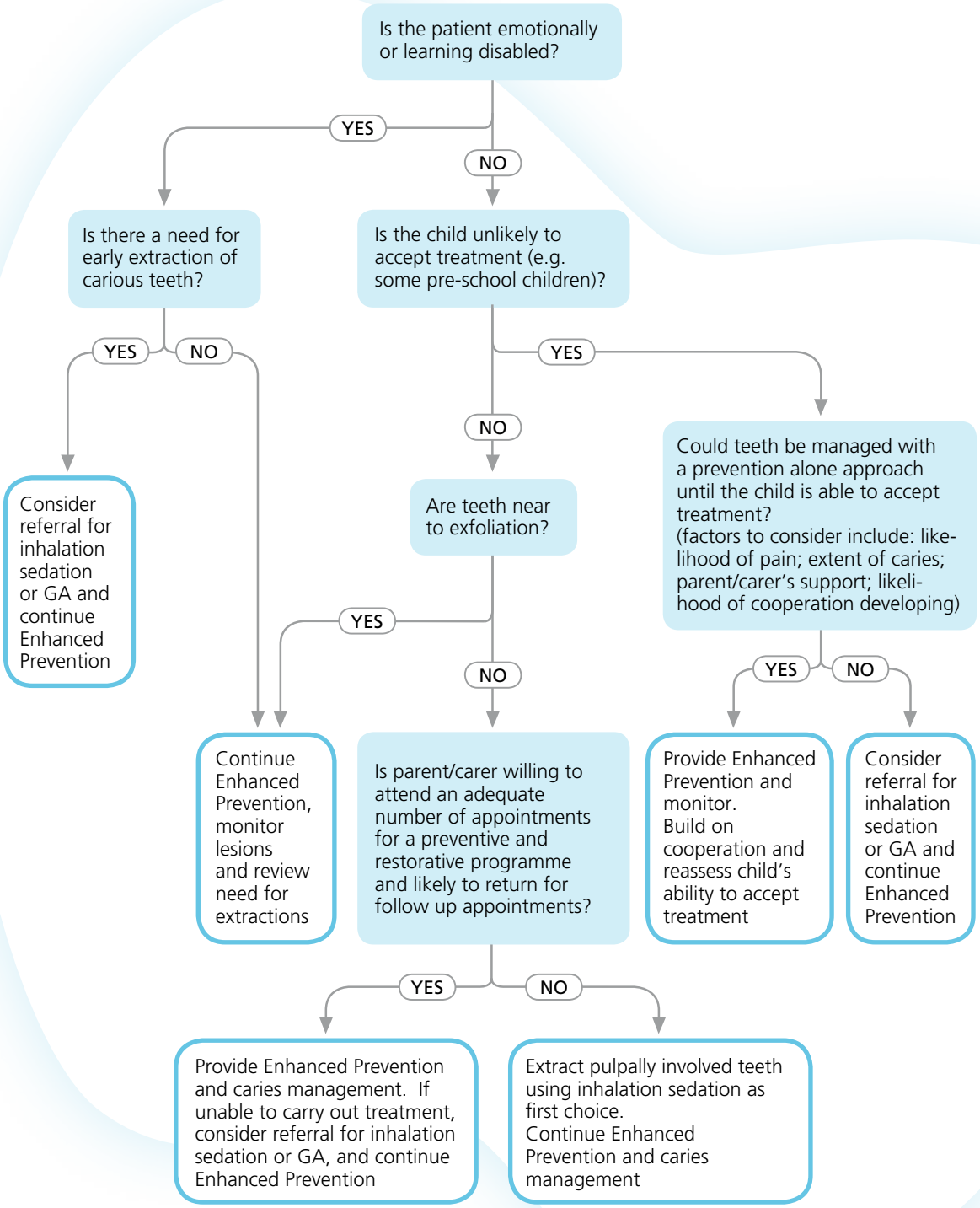
Referral for inhalation sedation or GA is not a management option for acute dental pain. It is the referring dentist's responsibility to relieve the child of dental pain.

- Before referring a child for treatment with inhalation sedation or GA, first relieve pain, provide prevention and attempt caries treatment using behavioural management techniques and local anaesthesia if indicated.
- If referring a child for inhalation sedation or GA, follow your local protocol, if there is one in place.
- Consider the need for temporary dressings to reduce the chance of further pain.
- Advise the parent/carer and child that their first visit to the centre will probably be for assessment only.
- Include all relevant information in the referral letter, such as radiographs if available, and state why in your opinion, sedation or GA is required (see Section 11 for Referral Letter Checklist).
- Do not promise the child and parent/carer that either inhalation sedation or GA will be provided; this decision must be made by the clinician at the referral centre.
- For further information consult the *'UK National Guideline for the Use of General Anaesthesia (GA) in Paediatric Dentistry'*[36].

10 Helping Children Accept Care

Figure 5 Assessing management options for the child with carious primary teeth

This diagram illustrates decisions to be made when considering referral for treatment after first attempting to provide care using good behavioural management techniques. It is assumed that if the child is in pain, this has been relieved and that there are no medical complications.



11 Referral for Care

Children's dental care is currently provided in Scotland as follows.

General Dental Practitioners in independent practice:

- are responsible for the routine care of the great majority of children under 17 years of age (approximately 75%).

Community and Salaried Dental Services (to be merged into the Scottish Public Dental Service):

- provide a safety net for routine care to a significant number of children who are not registered with a General Dental Practitioner (GDP);
- provide treatment for children on a referral basis both acting as a complementary service to GDPs and also accepting referrals from other health professionals;
- provide treatment which is not possible in general dental setting e.g. for young children who need special help, and those with severe physical or learning disabilities, or mental illness;
- are the main provider of specialist services which are not available in the general practice such as inhalation sedation and general anaesthesia for patients with anxiety or behavioural problems;
- have Paediatric Dental Specialist Practitioners available in some areas who offer treatment and provide advice on managing patients with particular medical and dental needs within the primary care settings;
- Coordinate and support the Childsmile provision of multidisciplinary programmes provided through the NHS dental and community settings and the Local Authority services such as education.

Hospital Dental Service:

- includes specialist and consultant paediatric dentists in the dental institutions in Aberdeen, Dundee, Edinburgh and Glasgow;
- provides care for patients requiring management with other specialties (orthodontics, restorative, oral surgery); also provides teaching and research facilities;
- provides care for medically compromised children;
- provides care for a small number of children within University Dental Outreach Centres.

As it is unacceptable to leave caries in children unmanaged, when the care of an individual child is not feasible within your service, it is imperative that the child is referred to the appropriate service to receive care. However, for children referred for one-off episodic care, it is the referring dentist's responsibility to provide their continued regular dental care during and after this period.

11 Referral for Care

- Only refer cases after first attempting treatment, using the strategies outlined in Section 10 if necessary.
- Be aware of the referral options available locally and the agreed referral procedures.
- When referring, ensure that this is to the appropriate service and that the agreed local procedures are followed.
- If a child is referred for one-off episodic care, ensure that you provide their continued dental care.
- Ensure all the relevant information is included in your referral letter. The following checklist can be used as a reminder.

11 Referral for Care

Checklist of information to include in a referral letter

- ☐ **Your details** - name, address, telephone number and email address
- ☐ **Patient details** - name, address, telephone number and date of birth
- ☐ **Patient's presenting complaint** - if a young child, parent/carer's concerns and expectations
- ☐ **Clinician's concerns**
    - Why are you referring the patient?
    - Has the child been in pain or had swelling?
- ☐ **Medical history**
- ☐ **Dental history**
    - What treatment has been attempted in this course of treatment before the referral was made?
    - How has the child coped with treatment?
    - Has local anaesthesia been used?
    - Has patient received inhalation sedation or general anaesthesia previously?
    - Have antibiotics been prescribed in the past six months?
    - Does the child attend for scheduled care appointments?
- ☐ **Social history**
    - Who is the principal carer/legal guardian?
    - Who does the child live with?
    - Has the child received dental health home or community support or intervention from other agencies?
- ☐ **Summary of oral health status** (e.g. caries and oral hygiene)
- ☐ **Details of your request**
    - Advice only
    - Care plan
    - Care that you are able to provide e.g prevention, but that you are referring the child for restorations to be done
- ☐ **Enclosures** (e.g. radiographs, study models, photographs)

12 Recall

Once the child's planned course of care is completed, a recall interval can be assigned. Based on the clinician's knowledge of the child and an assessment of disease levels and the overall risk of or from dental disease, the National Institute for Health and Clinical Excellence (NICE) recommends that a recall interval of between 3 and 12 months is assigned for children[37]. Given the high incidence of dental caries in children in some parts of Scotland, assigning a recall interval of 12 months is only likely to be appropriate for a relatively small proportion of child patients in these areas. In addition to considering dental caries, other factors will influence the recall interval, including the child's occlusal development and the need to provide any further care. It is important to reassess a child's caries risk at each recall visit as this may change over time.

- Assign a recall interval that is based on caries risk and specific to the oral health needs of the child.
    - The SDCEP *'Guidance on Comprehensive Oral Health Assessment'*[8] provides further details on assigning a risk-based recall interval.

At each recall visit:

- Carry out a full patient assessment, including asking about toothbrushing practice and dietary habits (see Section 3).
- Enquire about compliance with agreed action plans (see Section 6.1).
- Closely monitor lesions managed with prevention alone (see Section 8.4). Consider recording plaque scores on the surface of the lesions, recording caries progression via radiographs, photography or ICDAS, and ensure the parent/carer is made fully aware of their responsibility. If caries progresses, consider another option.
- Check the condition of fissure sealants: visually for wear and physically for integrity or leakage (see Section 6.5).
- Reassess the child's caries control and caries risk (see Section 3.5).
- If caries is not being effectively controlled by the parent/carer or the child, consider the need for additional support and the possibility of dental neglect and discuss this with the child's Health Visitor, School Nurse or GMP (see Section 13).
- Provide Standard or Enhanced Prevention in accordance with the child's risk of developing caries (see Section 6).
- Form a new personal care plan as required.

13 Providing Additional Support

In 2006 the national *'Getting It Right For Every Child'* (GIRFEC) Implementation Plan[38] was published and highlighted the need for everyone to work collaboratively to improve the health and welfare of children in Scotland. GIRFEC specifies that:

- everybody has a responsibility to take action
- actions should be child focused
- earlier support and intervention is required
- greater sharing of appropriate information is needed
- more and better multidisciplinary working is needed
- raised awareness of the child protection process is needed

Therefore, the dental team has a responsibility to act as soon as they recognise that a problem is emerging with a parent/carer or child's ability and motivation to comply with the dental preventive care, advice and treatment offered to them. The dental team needs to inform and discuss this with the family and the child's Health Visitor, School Nurse or GMP so that these agencies and others can establish appropriate home/community support and intervention. In addition, the dental team must act accordingly if they suspect general child neglect or abuse.

As this approach to care is evolving, it should be noted that in some areas the necessary mechanism to deliver multidisciplinary care might not be fully in place.

Childsmile is developing a national dental health surveillance and protection framework as part of a national, child focused, integrated, multidisciplinary child dental health pathway. This framework will be embedded within the National Child Health Programme from birth onwards to support the implementation of a cross cutting, multiagency GIRFEC approach to dental health. In support of this initiative, recommendations are included in this guidance to encourage the primary care dental team caring for children to contribute to this multi-agency approach to protecting children's health and wellbeing.

As described in Section 3.2, when a child first presents with a large amount of dental caries or is under the ongoing care of the dental team, it is important to encourage the parent/carer to take responsibility and ensure that the parent/carer is involved in the care planning process. The whole dental team should offer support and advice as illustrated in Table 2. Other professionals and agencies also have a role in providing dental health advice and support.

13 Providing Additional Support

Table 2 Actions for the dental team when a child presents with dental disease

Based on *'Child Protection and the Dental Team – An Introduction to Safeguarding Children in Dental Practice 2006'*[39] www.cpdt.org.uk.

Guide for action	Example applied to a child with caries who only attends when in pain	Suggested team member(s) responsible
Raise concerns with parents	Explain clinical findings, the possible impact on the child, and why you are concerned	Dentist
Explain what changes are required	Explain treatment needed and expectation of attendance	Dentist
	Give advice on changes needed in diet, fluoride use and oral hygiene	Dentist, therapist, hygienist or dental nurse, as appropriate
Offer support	Consider giving free fluoride toothpaste and a tooth brush	Dentist, therapist, hygienist or dental nurse
	Offer the parent/carer a choice of appointment times	Dental receptionist
	Listen for indications of a breakdown in communication or parental worries about the planned care, and offer to discuss again or to arrange a second opinion	All team members
	Discuss and offer to arrange community/home based dental health support via the child's Health Visitor/ School Nurse/GMP	All team members
Keep accurate records	Keep accurate clinical records	Dentist and/or other team members
	Keep accurate administrative records of appointments and attendance	Dental receptionist
Continue to liaise with parent/carers	Maintain communication with the parent/carer and repeat advice, so that they know what is expected of them. Continue to liaise with the child's Health Visitor/School Nurse/GMP to ensure this is being reinforced in community/home setting	All team members
Monitor progress	Arrange a recall visit	Dentist and Receptionist
Follow up failed appointments	Send fail to attend letters for all missed appointments, highlighting that treatment is outstanding and urging the patient to contact for a further appointment	Dentist/Receptionist
	Report fail to attends to the child's Health Visitor/ School Nurse/GMP (see letter in Appendix 5.4) or in accordance with local child protection guidance protocol on reporting failure to attend for scheduled care	Dentist/Receptionist

13 Providing Additional Support

13.1 Identifying and Managing Suspected Dental Neglect

If, despite providing the above support, a parent/carer and child does not comply at the level required to achieve and maintain good oral health,this might be indicative of dental neglect[9]. Reaching this conclusion will call for particularly careful judgement. This requires knowledge of the parent/carer's ability and motivation and the reasons given for missed or cancelled appointments, and good clinical documentation of caries experience and the support already offered.

When a child is known to have or be likely to experience caries, with or without pain and sepsis, the following can be considered to be indicators of dental neglect:

- repeated non-attendance for scheduled recall, scheduled care appointments or visits advised by Health Visitor with no response to fail to attend letters
- attendance for emergency pain relief more that once
- requirement for dental extractions/care under general anaesthetic more than once

It is a dentist's responsibility to follow up as early as possible any child they suspect is experiencing dental neglect, not just because it will help protect the child's future dental health but because the dental information may also have much broader implications when considered alongside other areas of ongoing welfare concern about the child.

- Contact the child's named Health Visitor, School Nurse or GMP to discuss your concerns about dental neglect with them and seek their support and advice on ongoing care management (a template letter is provided in Appendix 5.4).
  - The Health Visitor, School Nurse and GMP's records stay with the child if the family moves area. Providing these details enables them to gather health information to protect the child's welfare.
  - This will highlight those children and families who might require more support or help from NHS community, Local Authority Social Services or other agencies.
- Continue to offer and provide the child with appropriate prevention, advice and treatment.
  - The dental team might be regarded as negligent if carious teeth are not managed appropriately.
- If further advice is needed, contact your local child protection staff (see Appendix 4 for contact details).
- In those cases where the child is at risk of more immediate harm or other types of neglect, the above protocol is not appropriate. Follow your local child protection procedures.

The SDCEP *'Practice Support Manual'*[13] provides some further information on child protection, including recognising the signs of child abuse and neglect, and what to do if child abuse is known or suspected. For more detailed guidance refer to *'Child Protection and the Dental Team – An Introduction to Safeguarding Children in Dental Practice 2006'* [39,40].

14 Research, Audit and Service Development

14.1 Recommendations for Audit

Topics for audit and review should be chosen carefully to provide information that will improve the quality of care provided to children, for example:

- the accuracy and completeness of records (e.g. recording of caries risk assessment, taking of radiographs);
- for children under regular care, relating causes of attending with pain and sepsis with treatment previously provided;
- compliance with guidance on provision of fluoride varnish and fissure sealants;
- outcomes of treatment provided including adhesive restorations in primary molars, Hall crowns, and pulp therapies.

14.2 Recommendations for Research

Clinically important aspects of caries prevention and management in children for which research is required to improve the evidence base include:

- factors that increase parental and child compliance with brushing advice;
- utility of food and drink diaries;
- effectiveness of biological methods of caries management for the primary dentition, including fissure sealing over caries, partial caries removal and slice preparations;
- children's perceptions of dental treatment including extractions, inhalation sedation and general anaesthesia.

14 Research, Audit and Service Development

14.3 Service Development

In 2006, a Review of Primary Care Salaried Dental Services in Scotland[41] favoured the development of a targeted children's service. This would be complementary to the other services which children could attend. This differs from a comprehensive children's service which is dedicated to this client group and separate from other dental services. Similarly, at the national meeting of dental professionals convened during the development of this guidance, a clear majority were in favour of the development of an intermediate tier of children's dental services to operate between the services offered by local General Dental Practitioners and those offered by Paediatric Dental Consultants and Specialists.

Detailed recommendations regarding the future shape of children's dental services are not within the scope of this guidance. However, there is merit in building upon the range of existing services provided by GDPs, Community and Salaried Dental Services and the Hospital Dental Service and developing local, regional or national managed clinical networks. These networks should:

- recognise that children represent a wide and diverse group (neonatal and infant, pre-school, primary school, pre-teen, teen) with widely differing needs and challenges;
- include health professionals (including DCPs) from primary and secondary care, working in a coordinated manner, unconstrained by existing professional boundaries, to ensure equitable provision of high quality clinically effective services;
- be developed at the level (CHP, health board, region, national) that best meets the needs of the population and available professional resources;
- support GDPs in managing most children with referral for additional specialist services available as required;
- enable the efficient transfer of patients between the three main dental service providers in Scotland, GDPs, salaried dental services and hospital/university/outreach schemes;
- develop consistent protocols;
- be coordinated nationally;
- be supported by community based preventive programmes.

In Scotland, many of these points may be addressed through further development of the Childsmile Programme.

Appendix 1
Guidance Development

The Scottish Dental Clinical Effectiveness Programme

The Scottish Dental Clinical Effectiveness Programme (SDCEP) is an initiative of the National Dental Advisory Committee (NDAC) in partnership with NHS Education for Scotland.

The NDAC comprises representatives of all branches of the dental profession and acts in an advisory capacity to the Chief Dental Officer. It considers issues that are of national importance in Scottish dentistry and also provides feedback to other bodies within the Scottish Government on related, relevant healthcare matters. Periodically, sub-groups of the NDAC have produced publications, including *'Emergency Dental Drugs'*, *'Clinical Governance in Dental Primary Care'* and *'Dental Practice Advisors in Scotland'*.

To give a structured approach to providing clinical guidance for the dental profession, SDCEP was established in 2004 under the direction of the NDAC. The primary aim of the Programme is to support dental teams throughout Scotland by providing guidance developed by the profession for the profession on topics identified as priorities for dentistry in Scotland. SDCEP guidance is designed to help the dental team provide improved care for patients by bringing together, in a structured manner, the best available information that is relevant to priority areas in dentistry, and presenting this information in a form that can be interpreted easily and implemented.

The increasing emphasis within healthcare on the adoption of an evidence-based approach to clinical care and treatment, and changes in the regulatory framework of healthcare provision can present challenges for dental teams. To meet these challenges, SDCEP is developing guidance that takes a variety of forms to suit the diverse topics being addressed. Within many areas of dentistry there is a lack of the type of high-quality scientific evidence that usually informs the recommendations within conventional clinical guidelines. Despite this, there is some research evidence and a wealth of expertise and specialist knowledge within dentistry upon which to draw in order to make recommendations. In other areas, documentation, including legislation, policies and guidelines, is not in a readily accessible format for dental teams. A key aim of the Programme is to evaluate the best available information that is relevant to dentistry and to translate it into a form that members of the dental profession will be able to interpret easily and implement.

SDCEP is funded by the Scottish Government Health Directorates, and through its collaboration with NHS Education for Scotland, contributes to the implementation of the Scottish Government's Dental Action Plan, which aims to both modernise dental services and improve oral health in Scotland.

Appendix 1
Guidance Development

The Guidance Development Group

The Guidance Development Group comprised individuals from branches of the dental profession with a role in the care of children.

Dr Dafydd Evans (Chair)	Senior Lecturer and Honorary Consultant in Paediatric Dentistry, Dundee Dental Hospital and School, University of Dundee
Dr David Conway	Senior Clinical Lecturer in Dental Public Health, University of Glasgow Dental School
Brett Duane	Assistant Clinical Director (Health Promotion), Community Dental Services, NHS Fife
Martin Foster	Assistant Clinical Director, Children's Dental Service, NHS Lothian
John Glen	General Dental Practitioner, Cowdenbeath, Fife
Dr Nicola Innes	Clinical Lecturer in Paediatric Dentistry, Dundee Dental Hospital and School, University of Dundee (formerly General Dental Practitioner, Tayside)
Ray McAndrew	Clinical Director of Community Dental Services, NHS Greater Glasgow
Derek Richards	Consultant in Dental Public Health, NHS Forth Valley
Margaret Ross	Senior Lecturer for Dental Care Professionals, Edinburgh Dental Institute
Prof. Richard Welbury	Professor of Paediatric Dentistry, University of Glasgow Dental School

The Guidance Development Group would like to thank the following individuals for their valuable contributions to the development of this guidance: David Bearn (Professor of Orthodontics, Dundee Dental Hospital and School, University of Dundee) for advice on orthodontic aspects of dental extractions, Ailsa Morrant (Consultant in Dental Public Health, NHS Ayrshire and Arran) for advice on how the dental team works collaboratively with other agencies regarding child welfare, and Simon Scott (Computing and Media Services, University of Dundee) for clinical photography.

Appendix 1
Guidance Development

The Programme Development Team

The Guidance Development Group works closely with the Programme Development Team, which provides project management and administrative support and is responsible for the methodology of guidance development. The team facilitates all aspects of guidance development by searching and appraising information and evidence, conducting research, liaising with external organisations, editing the guidance, and managing the publication and dissemination of guidance materials.

Dr Douglas Stirling	Programme Manager – Guidance and Programme Development and SDCEP lead for this guidance project
Prof. Jan Clarkson	Director
Dr Gillian MacKenzie	Research and Development Researcher – Developmental Editing
Dr Linda Young	Research and Development Researcher – Evaluation of Implementation
Rosalind Alexander	Clinical Research Fellow
Jill Farnham	Programme Administrator
Elizabeth Payne	Programme Administrator

Guidance Development Methodology

The methodology used to develop SDCEP guidance mirrors that used to develop high-quality guidelines. It aims to be transparent, systematic and to adhere as far as possible to international standards set out by the Appraisal of Guidelines Research and Evaluation (AGREE) Collaboration (www.agreecollaboration.org/).

The guiding principle for developing guidance within SDCEP is to first source existing guidelines, policy documents, legislation or other recommendations. Similarly, relevant systematic reviews are also identified. These documents are appraised for their quality of development, evidence base and applicability to the remit of the guidance under development. In the absence of these documents or when supplementary information is required, published literature is searched and unpublished work is sought.

This guidance is based largely on recommendations within SIGN guidelines 47[6] and 83[7], relevant systematic reviews and other published literature listed in the reference section, research evidence and the opinion of experts and experienced practitioners.

SDCEP guidance is subject to consultation and peer review within the profession prior to publication. The consultation draft of *'Prevention and Management of Dental Caries in Children'* was sent to individuals and bodies with a specific interest in children's dental care and those involved in the organisation of dental services or dental education in Scotland. To obtain feedback from the end-users of the guidance, the consultation draft was sent to a random sample of dentists for their assessment and all dentists in Scotland were notified that the consultation draft was available and invited to comment.

Appendix 1
Guidance Development

All comments received through the consultation process were considered carefully by the Guidance Development Group and the guidance amended prior to peer review. Further amendments were made in response to comments from peer reviewers before publication.

Further information about the methodology used to develop this guidance is available on our website: www.scottishdental.org/cep.

Declarations of interest are made by all contributors to SDCEP. Details are available on request.

Review and Updating

A review of all aspects of the context of this guidance (regulations, legislation, trends in working practices and evidence) will take place three years after publication and, if this has changed significantly, the guidance will be updated accordingly.

Steering Group

A Steering Group oversees all the activities of SDCEP and includes representatives of each Guidance Development Group and the dental institutions in Scotland.

Prof. Jeremy Bagg (Chairman)	Chairman of the National Dental Advisory Committee; Head of Glasgow Dental School and Professor of Clinical Microbiology, University of Glasgow
Graham Ball	Consultant in Dental Public Health, NHS Fife
Prof. Jan Clarkson	Director, Scottish Dental Clinical Effectiveness Programme; Programme Director, Dental Health Services Research Unit, University of Dundee
Dr Dafydd Evans	Senior Lecturer and Honorary Consultant in Paediatric Dentistry, Dundee Dental Hospital and School, University of Dundee
Prof. Richard Ibbetson	Director, Edinburgh Postgraduate Dental Institute, University of Edinburgh
Alice Miller	General Dental Practitioner, Duns, Borders; VT Adviser, NHS Education for Scotland
Prof. Nigel Pitts	Director, Dental Health Services Research Unit, University of Dundee
Derek Richards	Specialist Advisor to the Programme Development Team; Consultant in Dental Public Health, NHS Forth Valley; Director of the Centre for Evidence-Based Dentistry, Oxford
Dr Nigel Robb	Senior Lecturer in Sedation in Relation to Dentistry, University of Glasgow Dental School
Prof. William Saunders	Dean of the Dental School, University of Dundee
Alan Whittet	General Dental Practitioner, Longniddry; Dental Practice Adviser, NHS Lothian
Prof. David Wray	Professor of Oral Medicine, University of Glasgow Dental School

Appendix 2
Childsmile

Childsmile[4] is a national programme, funded by the Scottish Government, designed to improve the dental health of children in Scotland and reduce inequalities both in dental health and access to dental services. The main components of Childsmile are outlined in the table below. Further information is available on www.child-smile.org.

Childsmile will operate in all Health Boards across Scotland once it is fully rolled out. This integrated programme combines a population approach, where every child will have access to Childsmile dental services, with additional support targeted towards children most at risk.

Childsmile component	Age	Content overview
Childsmile Practice	From birth to 16 years of age	• Promoting oral health from birth with advice, support and clinical prevention (fluoride varnish & fissure sealants) tailored to the needs of the individual child via primary care dental services. • Childsmile practices will also be a mechanism for delivering appropriate caries management (as described in this guidance) throughout childhood. • Additional home and community support and facilitation into dental services via community based dental health support workers.
Childsmile Core Toothbrushing	From birth to 5 years of age	• Oral health packs given to every child age 1, 3 (2 packs), 4 (2 packs), 5 years. • Every child in daily supervised nursery toothbrushing. • 20% of children (most deprived quintile local SIMD) at P1, P2 to be in daily supervised toothbrushing programmes.
Childsmile Nursery (targeted within the most deprived local SIMD quintile)	At an appropriate age (normally 3-4 years of age)	• Fluoride varnish applied 6 monthly via Childsmile Dental Teams consisting of extended duty dental nurses and a dental health support worker.
Childsmile School (targeted within the most deprived local SIMD quintile)	From 5 years of age	• Fluoride varnish applied 6 monthly via Childsmile dental teams consisting of extended duty dental nurses and a dental health support worker. • Fissure sealants applied at age 6 to 7 years.
Childsmile Dental Health Surveillance and Protection Framework	From birth to 16 years of age	• Through integration with the National Child Health Programme, monitor uptake, compliance and outcome of child dental health pathway from birth. • Support systematic and ad hoc dental health input to the child protection process.

Appendix 3
The SIMD (Scottish Index of Multiple Deprivation)

The SIMD (Scottish Index of Multiple Deprivation) was introduced in 2004 and most recently revised in 2009 to identify small area concentrations of multiple deprivation across Scotland by assessing the population in each 'small area' against numerous relevant factors. The resulting SIMD ranks can be used to compare data zones by providing a relative ranking from most deprived (rank 1) to least deprived (rank 6505), and can be used to identify the most deprived areas, commonly by applying a cut off such as 10%, 15% or 20%. The SIMD is important to dentistry because it has been shown that deprivation is related to a higher risk of dental caries and other oral disease. Recording the postcode of each patient (which can be used to identify the SIMD of the area) is one way of ascertaining whether a patient is at higher risk of oral disease because of socio-economic factors[42, 43].

To identify the SIMD for a particular postcode:

- Access the webpage www.scotland.gov.uk/Topics/Statistics/SIMD/SIMDPostcodeLookup.
- Select the link for the relevant geographical area.
- Open the spreadsheet file (this requires Microsoft Excel).
- Follow the instructions to search for the required postcode and note the figure in the corresponding Quintile column.
    - Quintile = 1 means that this postcode is within the 20% most deprived SIMD data zones.
    - Quintile = 5 means that this postcode is within the 20% least deprived SIMD data zones.

Appendix 4
Child Protection Contacts in NHS Boards

Child protection staff can provide advice when there are concerns about a child's welfare. Contact details for each NHS Health Board are given below. These were correct in December 2009 but this information is subject to change. In case of difficulties in contacting directly, use the general telephone number for the Health Board or call the National Child Protection Line (freephone 0800 022 3222). A leaflet 'Protecting Children and Young People' is also available on the National Child Protection Line website (www.infoscotland.com/childprotection/). Local child protection procedures are available on most local NHS intranets.

NHS Health Board and general telephone number	**Address/telephone**	**NHS Health Board** and general telephone number	**Address/telephone**
Ayrshire & Arran 01292 611040	Child Protection Health Team NHS Ayrshire & Arran Room 45, 1st Floor Ayrshire Central Hospital Kilwinning Road, Irvine, KA12 8SS **01294 323431**	**Lanarkshire** 08453 130130	NHS Lanarkshire Child Protection Team Regent House 9 High Patrick Street Hamilton, ML3 7ES **01698 452861/2**
Borders 01896 828282	Child Protection Unit Albert Place Galashiels, TD1 3DL **01896 662762**	**Lothian** 0131 5369000	NHS Lothian Child Protection Office Vega Building Flasches Yard South Gyle Crescent Edinburgh, EH12 9LB **0131 316 6670**
Dumfries & Galloway 01387 246246	Child Health Nithbank Dumfries, DG1 2SD **01387 244572**	**Orkney** 01856 888000	Children's Protection Coordinator Garden House New Scapa Road Kirkwall, KW15 1BQ **01856 880777**
Fife 01592 643355	Child Protection Service Greenfield Clinic Flat 1, Willow Drive Whytemans Brae Kirkcaldy, KY11 2LF **01592 648114**	**Shetland** 01595 743060	Social Care 91/93 St Olaf, Lerwick Shetland, ZE1 0ES **01595 744400**

Appendix 4

Child Protection Contacts in NHS Boards

Forth Valley 01786 463031	Child Protection Department NHS Forth Valley 9 Gladstone Place Stirling, FK8 2AH **01786 434770**	**Tayside** 01382 818479	Armistead Child Development Centre Kings Cross Hospital Clepington Road Dundee, DD3 8EA **01382 835107**
Greater Glasgow & Clyde 0141 2014444	Child Protection Unit 2nd Floor Medical Records Building RHSC, Yorkhill Dalnair Street Glasgow, G3 8SJ **0141 201 9225**	**Western Isles** 01851 702997	Senior Child Protection Nurse Balivanich Clinic Benbecula Western Isles HS7 5LA **01870 602266**
Grampian 0845 4566000	Combined Child Health Royal Aberdeen Children's Hospital Westburn Rd Aberdeen, AB25 5ZG **01224 551706**	**NHS24** 0800 224488	Norseman House 2 Ferrymuir South Queensferry EH30 9QZ **0131 3004359**
Highland (including Argyll & Bute) 01463 717123	Child Protection Admin Manager NHS Highland Morven House Raigmore Hospital Inverness, IV2 3UJ **01463 701307**		

Appendix 5
Supporting Tools

A5.1 Care Checklist

Going through this checklist for each child patient is a means of confirming that the care you provide includes all of the essential elements of caries prevention and management.

Before placing a child on recall, ask yourself the following:

As part of your assessment of the child have you:

- ☐ encouraged the parent/carer to take responsibility for the oral health of their child, particularly with regard to brushing, and regular attendance?
- ☐ arranged multidisciplinary support via a Health Visitor or School Nurse, if required?
- ☐ checked all existing sealants:
  - visually, for wear
  - physically with a probe, for integrity/leakage
  - and "topped up" if necessary?
- ☐ checked radiographically the occlusal and approximal surfaces of the permanent molars for early caries, or recorded a sound reason not to?
- ☐ checked clinically and radiographically for the presence of sepsis associated with any carious primary teeth?
- ☐ checked whether any previously selected prevention-alone caries management strategy is effective (caries arresting, good plaque control on surface of lesion) and, if not, chosen an alternative strategy?
- ☐ carried out and recorded a caries risk assessment?
- ☐ considered the possibility of dental neglect and taken appropriate action if suspected?

As part of your preventive care have you:

- ☐ checked that the child and the parent/carer understand the critical importance of thorough toothbrushing and these key messages?
  - brush twice a day
  - use an appropriate amount of ≥1000 ppm fluoride toothpaste
  - 'spit, don't rinse'
- ☐ given dietary advice?
- ☐ applied sodium fluoride varnish (5%), or recorded a valid reason not to?
- ☐ fissure sealed all susceptible pits and fissures if the child is at increased caries risk, or recorded a valid reason not to?
- ☐ agreed an action plan with the child and parent/carer to improve compliance with preventive advice?

Appendix 5
Supporting Tools

As part of your caries management have you:

- ☐ managed caries in the pits or fissures of 6s and 7s appropriately?
- ☐ managed enamel-only approximal caries in 6s and 7s effectively?
- ☐ considered the prognosis of any carious 6s and if this is poor, considered planned loss?
- ☐ selected an appropriate management option for any active carious lesions in the primary dentition that you assess as likely to cause the child pain or sepsis before exfoliation?
- ☐ used appropriate behavioural management techniques to help the child to accept treatment or referred the child who is unable to accept treatment despite behavioural management techniques?

A5.2 Prevention Log

The "Prevention Log" has been developed to assist clinicians in developing a preventive approach to disease management. It is intended as a checklist to help indicate what should be done, when and how often, rather in the manner of a "servicing schedule" designed to keep the mouth running in a healthy state.

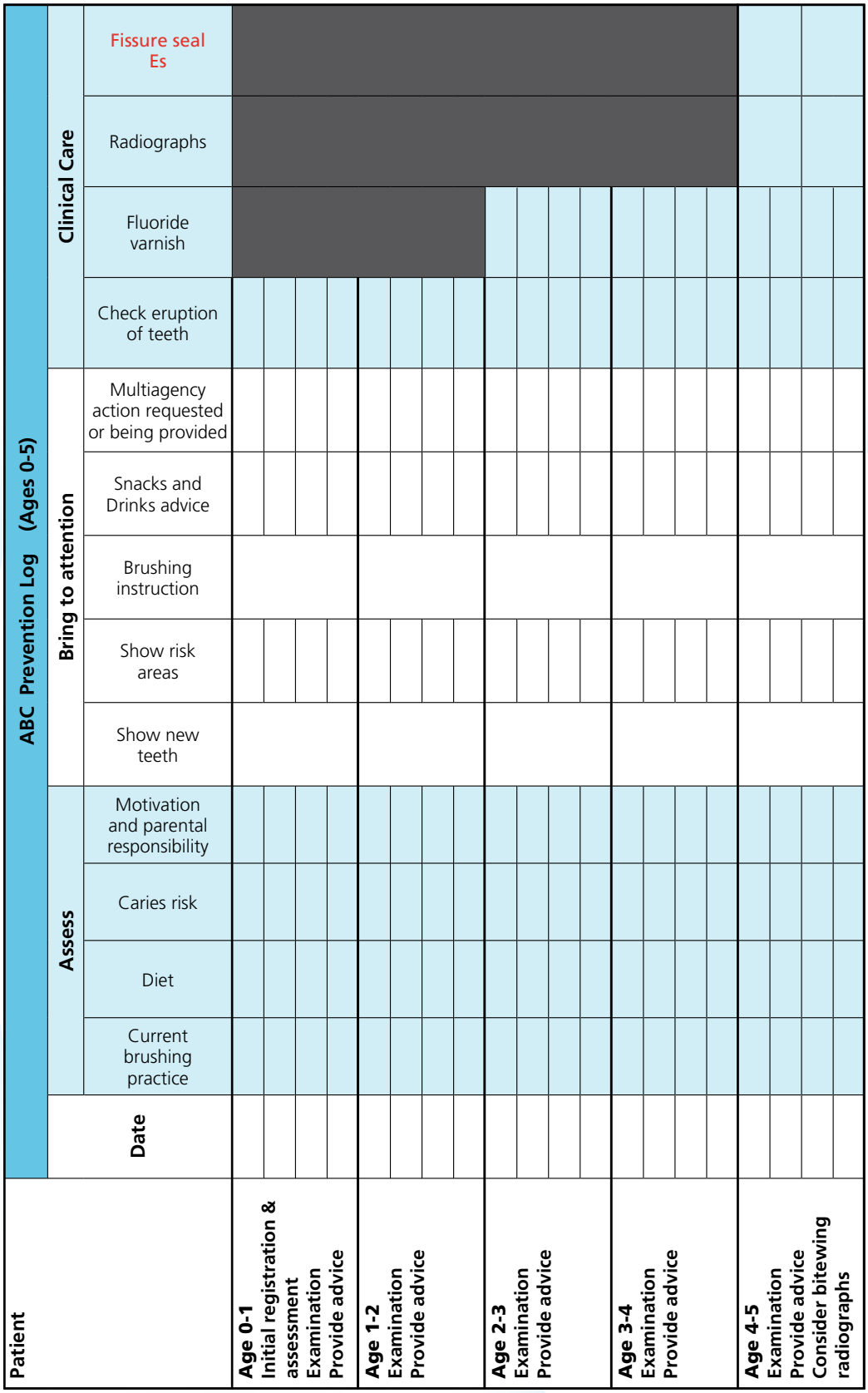
The Prevention Log highlights three aspects of providing preventive care effectively, ABC, being **A**ssess, **B**ring to Attention, and **C**linical care, with each of these broken into age & stage specific individual actions.

The idea is that the log shows the specific actions that should be carried out at each visit to effectively deliver comprehensive preventive care. Completion of each action should be noted in the log.

The schedule of visits that would be expected are set out on the left of the chart, with scope for up to 4 recall visits a year (see Section 12). The columns show the interventions to be considered at these visits. Those interventions specifically for children assessed as at increased caries risk are shown in red (**Enhanced Prevention**).

This Prevention Log is available to download from the SDCEP website.

Appendix 5
Supporting Tools



ABC Prevention Log (Ages 0-5)			
Patient			
		Date	
	Assess	Current brushing practice	
		Diet	
		Caries risk	
		Motivation and parental responsibility	
	Bring to attention	Show new teeth	
		Show risk areas	
		Brushing instruction	
		Snacks and Drinks advice	
		Multiagency action requested or being provided	
	Clinical Care	Check eruption of teeth	
		Fluoride varnish	
		Radiographs	
		Fissure seal Es	
Age 0-1 Initial registration & assessment Examination Provide advice			
Age 1-2 Examination Provide advice			
Age 2-3 Examination Provide advice			
Age 3-4 Examination Provide advice			
Age 4-5 Examination Provide advice Consider bitewing radiographs			

Appendix 5
Supporting Tools

Patient	ABC Prevention Log (Ages 5-10)													
	Date	Assess				Bring to attention					Clinical Care			
		Current brushing practice	Diet	Caries risk	Motivation and parental responsibility	Show new teeth	Show risk areas	Brushing instruction	Snacks and Drinks advice	Multiagency action requested or being provided	Fluoride varnish	Radiographs	Fissure sealants: place, monitor and top up	Monitor occlusion and prognosis of 6s
Age 5-6 Examination Provide advice Fissure seal 6s Advise on brushing 6s laterally														
Age 6-7 Examination Provide advice														
Age 7-8 Examination Provide advice														
Age 8-9 Examination Provide advice Assess prognosis of 6s														
Age 9-10 Examination Provide advice														

Appendix 5
Supporting Tools

ABC Prevention Log (Ages 10-16)																															
		Assess				Bring to attention			Clinical Care																						
Patient	Date	Current brushing practice	Diet	Caries risk	Motivation and child taking responsibility for prevention	Brushing instruction emphasising 7s	Snacks and Drinks advice emphasising acid content of drinks	Multiagency action requested or being provided	Fluoride varnish	Radiographs	Fissure sealants: place, monitor and top up	Monitor occlusion																			
Age 10-11 Examination Provide advice Fissure seal 7s Advise on brushing 7s																															
Age 11-12 Examination Provide advice Fissure seal 7s Advise on brushing 7s																															
Age 12-13 Examination Provide Advice Monitor for changes in caries risk and signs of erosion																															
Age 13-14 Examination Provide Advice																															
Age 14-15 Examination Provide advice																															
Age 15-16 Examination Provide advice																															

Appendix 5
Supporting Tools

A5.3 Caries Prevention Reminder by Age

The following tables are for members of the dental team to refer to in practice. They provide a comprehensive reminder of preventive measures that are suited to children based on their age.

The tables within this 'Prevention Reminder' are available to download from the SDCEP website.

When a child attends for dental care, refer to the page that corresponds to the child's age for a comprehensive reminder of the preventive measures that are suited to children of that age.

Standard Prevention for ALL children

Enhanced Prevention for children assessed as at increased caries risk

Many of these interventions are applicable to children of all ages while others are age-specific.

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 0 to 1 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Parent/carer's ability and motivation Brushing practice Diet Caries risk	
Bring to attention risk areas	Erupting teeth	
Motivation	Consider use of action planning	Consider contacting Health Visitor for support
Toothbrushing	Hands on brushing instruction early during the child's care Provide advice at least once per year: • 2 minutes twice daily • Brush as soon as teeth erupt • Use a smear of 1000 ppm fluoride paste • Adult supervision	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste
Diet	Provide advice at least once per year: • Do not place fruit juices, sweetened milk or soy formula milk in feeding bottles • Nothing after brushing at night	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of action planning Enquire about feeding patterns

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 1 to 2 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Parent/carer's ability and motivation Brushing practice Diet Caries risk	
Bring to attention risk areas	Erupting Ds and Cs	
Motivation	Consider use of action planning	Consider contacting Health Visitor for support Consider possible dental neglect
Toothbrushing	Hands on brushing instruction early during the child's care if not given previously Provide advice at least once per year: • 2 minutes twice daily • Brush as soon as teeth erupt • Use a smear of 1000 ppm fluoride paste • Adult supervision	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste
Diet	Provide advice at least once per year: • Restrict sugar to no more than 4 times per day • Drink only water or full-fat milk between meals • Sugar-free snacks only • Nothing after brushing at night • Be aware of hidden sugars in food • Be aware of acid content of drinks	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of diet diaries Consider use of action planning

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 2 to 3 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Parent/carer's ability and motivation Brushing practice Diet Caries risk	
Bring to attention risk areas	Newly erupted Es	
Motivation	Consider use of action planning	Consider contacting Health Visitor for support Consider possible dental neglect
Toothbrushing	Hands on brushing instruction early during the child's care if not given previously Provide advice at least once per year: • 2 minutes twice daily • Use a smear of 1000 ppm fluoride paste • Spit, don't rinse • Adult supervision	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste Consider toothbrushing charts
Diet	Provide advice at least once per year: • Restrict sugar to no more than 4 times per day • Drink only water or milk between meals (may now drink semi-skimmed milk) • Sugar-free snacks only • Nothing after brushing at night • Be aware of hidden sugars in food • Be aware of acid content of drinks	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of diet diaries Consider use of action planning
Topical fluorides	Apply fluoride varnish 2 times per year	Apply fluoride varnish an additional 1-2 times per year

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 3 to 4 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Parent/carer's ability and motivation Brushing practice Diet Caries risk	
Motivation	Consider use of action planning	Consider contacting School Nurse for support Consider possible dental neglect
Toothbrushing	Hands on brushing instruction early during the child's care if not given previously Provide advice at least once per year: • 2 minutes twice daily • Use a pea-sized amount of 1000 ppm fluoride paste • Spit, don't rinse • Adult supervision	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste Consider toothbrushing charts Consider recommending 1350-1500 ppm fluoride toothpaste
Diet	Provide advice at least once per year: • Restrict sugar to no more than 4 times per day • Drink only water or milk between meals (may now drink semi-skimmed milk) • Sugar-free snacks only • Nothing after brushing at night • Be aware of hidden sugars in food • Be aware of acid content of drinks	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of diet diaries Consider use of action planning
Topical fluorides	Apply fluoride varnish 2 times per year	Apply fluoride varnish an additional 1-2 times per year

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 4 to 5 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Parent/carer's ability and motivation Brushing practice Diet Caries risk	
Radiographs		Consider taking initial bitewing radiographs
Motivation	Consider use of action planning	Consider contacting Health Visitor for support Consider possible dental neglect
Toothbrushing	Hands on brushing instruction early during the child's care if not given previously • Provide advice at least once per year: • 2 minutes twice daily • Use a pea-sized amount of 1000 ppm fluoride paste • Spit, don't rinse • Adult supervision	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste Consider toothbrushing charts Consider disclosing Consider recommending 1350-1500 ppm fluoride toothpaste Consider advising parent/carer to floss DE contacts
Diet	Provide advice at least once per year: • Restrict sugar to no more than 4 times per day • Drink only water or milk between meals (may now drink semi-skimmed milk) • Sugar-free snacks only • Nothing after brushing at night • Be aware of hidden sugars in food • Be aware of acid content of drinks	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of diet diaries Consider use of action planning
Topical fluorides	Apply fluoride varnish 2 times per year	Apply fluoride varnish an additional 1-2 times per year
Fissure sealants		Consider fissure sealing Es if cooperative Monitor existing sealants and top up if indicated

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 5 to 6 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Parent/carer's ability and motivation Brushing practice Diet Caries risk	
Bring to attention risk areas	Newly erupted 6s	
Radiographs	Bitewing radiographs, if not taken in previous 12-18 months	Bitewing radiographs, if not taken in previous 6-12 months
Motivation	Consider use of action planning	Consider contacting School Nurse for support Consider possible dental neglect
Toothbrushing	Provide advice at least once per year: • 2 minutes twice daily • Use a pea-sized amount of 1000 ppm fluoride paste • Spit, don't rinse • Adult supervision • Brush 6s laterally • Hands on brushing instruction if not given previously	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste Consider toothbrushing charts Consider disclosing Consider recommending 1350-1500 ppm fluoride toothpaste Consider advising parent/carer to floss DE and 6E contacts
Diet	Provide advice at least once per year: • Restrict sugar to no more than 4 times per day • Drink only water or milk (preferably semi-skimmed or skimmed) between meals • Sugar-free snacks only • Nothing after brushing at night • Be aware of hidden sugars in food • Be aware of acid content of drinks	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of diet diaries Consider use of action planning
Topical fluorides	Apply fluoride varnish 2 times per year	Apply fluoride varnish an additional 1-2 times per year
Fissure sealants		Fissure seal all pits and fissures of 6s Monitor existing sealants and top up if indicated Consider temporary GIC sealants for partially erupted 6s

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 6 to 7 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Parent/carer's ability and motivation Brushing practice Diet Caries risk	
Bring to attention risk areas	Newly erupted 6s and incisors	
Radiographs	Bitewing radiographs, if not taken in previous 12-18 months	Bitewing radiographs, if not taken in previous 6-12 months
Motivation	Consider use of action planning	Consider contacting School Nurse for support Consider possible dental neglect
Toothbrushing	Provide advice at least once per year: • 2 minutes twice daily • Use a pea-sized amount of 1000 ppm fluoride paste • Spit, don't rinse • Adult supervision • Brush 6s laterally • Hands on brushing instruction if not given previously	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste Consider toothbrushing charts Consider disclosing Consider recommending 1350-1500 ppm fluoride toothpaste Consider advising parent/carer to floss DE and 6E contacts
Diet	Provide advice at least once per year: • Restrict sugar to no more than 4 times per day • Drink only water or milk (preferably semi-skimmed or skimmed) between meals • Sugar-free snacks only • Nothing after brushing at night • Be aware of hidden sugars in food • Be aware of acid content of drinks	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of diet diaries Consider use of action planning
Topical fluorides	Apply fluoride varnish 2 times per year	Apply fluoride varnish an additional 1-2 times per year
Fissure sealants		Fissure seal all pits and fissures of 6s Monitor existing sealants and top up if indicated Consider temporary GIC sealants for partially erupted 6s

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 7 to 8 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Parent/carer's ability and motivation Brushing practice Diet Caries risk	
Bring to attention risk areas	Erupting incisors	
Radiographs	Bitewing radiographs, if not taken in previous 12-18 months	Bitewing radiographs, if not taken in previous 6-12 months
Motivation	Consider use of action planning	Consider contacting School Nurse for support Consider possible dental neglect
Toothbrushing	Provide advice at least once per year: • 2 minutes twice daily • Use 1350-1500 ppm fluoride paste • Spit, don't rinse • Adult supervision • Brush 6s laterally • Hands on brushing instruction if not given previously	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste Consider toothbrushing charts Consider disclosing Consider advising parent/carer to floss DE and 6E contacts
Diet	Provide advice at least once per year: • Restrict sugar to no more than 4 times per day • Drink only water or milk (preferably semi-skimmed or skimmed) between meals • Sugar-free snacks only • Nothing after brushing at night • Be aware of hidden sugars in food • Be aware of acid content of drinks	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of diet diaries Consider use of action planning
Topical fluorides	Apply fluoride varnish 2 times per year	Apply fluoride varnish an additional 1-2 times per year Consider the use of alcohol-free fluoride mouthwash
Fissure sealants		Fissure seal pits and fissures of all permanent teeth Monitor existing sealants and top up if indicated Consider temporary GIC sealants for partially erupted 6s

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 8 to 9 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Child's ability and motivation Brushing practice Diet Caries risk	
Occlusion	Consider prognosis of 6s and position of 3s	
Radiographs	Bitewing radiographs, if not taken in previous 12-18 months	Bitewing radiographs, if not taken in previous 6-12 months
Motivation	Consider use of action planning	Consider contacting School Nurse for support Consider possible dental neglect
Toothbrushing	Provide advice at least once per year: • 2 minutes twice daily • Use 1350-1500 ppm fluoride paste • Spit, don't rinse • Hands on brushing instruction if not given previously	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste Consider toothbrushing charts Consider disclosing Consider recommending floss wands for the 6E contact if radiographs show early approximal caries on 6s
Diet	Provide advice at least once per year: • Restrict sugar to no more than 4 times per day • Drink only water or milk (preferably semi-skimmed or skimmed) between meals • Sugar-free snacks only • Nothing after brushing at night • Be aware of hidden sugars in food • Be aware of acid content of drinks	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of diet diaries Consider use of action planning
Topical fluorides	Apply fluoride varnish 2 times per year	Apply fluoride varnish an additional 1-2 times per year Consider the use of alcohol-free fluoride mouthwash
Fissure sealants		Fissure seal pits and fissures of all permanent teeth Monitor existing sealants and top up if indicated

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 9 to 10 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Child's ability and motivation Brushing practice Diet Caries risk	
Occlusion	Consider prognosis of 6s and position of 3s	
Radiographs	Bitewing radiographs, if not taken in previous 12-18 months	Bitewing radiographs, if not taken in previous 6-12 months
Motivation	Consider use of action planning	Consider contacting School Nurse for support Consider possible dental neglect
Toothbrushing	Provide advice at least once per year: • 2 minutes twice daily • Use 1350-1500 ppm fluoride paste • Spit, don't rinse	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste Consider toothbrushing charts Consider disclosing Consider recommending floss wands for the 6E contacts if radiographs show early approximal caries on 6s
Diet	Provide advice at least once per year: • Restrict sugar to no more than 4 times per day • Drink only water or milk (preferably semi-skimmed or skimmed) between meals • Sugar-free snacks only • Nothing after brushing at night • Be aware of hidden sugars in food • Be aware of acid content of drinks	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of diet diaries Consider use of action planning
Topical fluorides	Apply fluoride varnish 2 times per year	Apply fluoride varnish an additional 1-2 times per year Consider the use of alcohol-free fluoride mouthwash
Fissure sealants		Fissure seal pits and fissures of all permanent teeth Monitor existing sealants and top up if indicated

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 10 to 11 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Child's ability and motivation Brushing practice Diet Caries risk	
Occlusion	Consider necessity for ortho referral	
Radiographs	Bitewing radiographs, if not taken in previous 12-18 months	Bitewing radiographs, if not taken in previous 6-12 months
Motivation	Consider use of action planning	Consider contacting School Nurse for support Consider possible dental neglect
Toothbrushing	Provide advice at least once per year: • 2 minutes twice daily • Use 1350-1500 ppm fluoride paste • Spit, don't rinse • Hands on brushing instruction if not given previously	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste Consider toothbrushing charts Consider disclosing Consider prescribing 2800 ppm fluoride toothpaste Consider recommending floss wands for the 6E contacts if radiographs show early approximal caries on 6s
Diet	Provide advice at least once per year: • Restrict sugar to no more than 4 times per day • Drink only water or milk (preferably semi-skimmed or skimmed) between meals • Sugar-free snacks only • Nothing after brushing at night • Be aware of hidden sugars in food • Be aware of acid content of drinks	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of diet diaries Consider use of action planning
Topical fluorides	Apply fluoride varnish 2 times per year	Apply fluoride varnish an additional 1-2 times per year Consider the use of alcohol-free fluoride mouthwash
Fissure sealants		Fissure seal pits and fissures of all permanent teeth Monitor existing sealants and top up if indicated

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 11 to 12 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Child's ability and motivation Brushing practice Diet Caries risk	
Bring to attention risk areas	Newly erupted 7s	
Occlusion	Consider necessity for ortho referral	
Radiographs	Bitewing radiographs, if not taken in previous 12-18 months	Bitewing radiographs, if not taken in previous 6-12 months
Motivation	Consider use of action planning	Consider contacting School Nurse for support Consider possible dental neglect
Toothbrushing	Provide advice at least once per year: • 2 minutes twice daily • Use 1350-1500 ppm fluoride paste • Spit, don't rinse • Brush 7s laterally • Hands on brushing instruction if not given previously	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste Consider toothbrushing charts Consider disclosing Consider prescribing 2800 ppm fluoride toothpaste Consider recommending floss wands for 6E contact if radiographs show early approximal caries on 6s
Diet	Provide advice at least once per year: • Restrict sugar to no more than 4 times per day • Drink only water or milk (preferably semi-skimmed or skimmed) between meals • Sugar-free snacks only • Nothing after brushing at night • Be aware of hidden sugars in food • Be aware of acid content of drinks	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of diet diaries Consider use of action planning
Topical fluorides	Apply fluoride varnish 2 times per year	Apply fluoride varnish an additional 1-2 times per year Consider the use of alcohol-free fluoride mouthwash
Fissure sealants		Fissure seal pits and fissures of all permanent teeth, including 7s Monitor existing sealants and top up if indicated Consider temporary GIC sealants for partially erupted

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 12 to 13 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Child's ability and motivation Brushing practice Diet Changing caries risk Signs of erosion	
Bring to attention risk areas	Newly erupted 7s	
Occlusion	Consider necessity for ortho referral	
Radiographs	Bitewing radiographs, if not taken in previous 12-18 months	Bitewing radiographs, if not taken in previous 6-12 months
Motivation	Consider use of action planning	Consider contacting School Nurse for support Consider possible dental neglect
Toothbrushing	Provide advice at least once per year: • 2 minutes twice daily • Use 1350-1500 ppm fluoride paste • Spit, don't rinse • Brush 7s laterally • Hands on brushing instruction if not given previously	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste Consider toothbrushing charts Consider disclosing Consider prescribing 2800 ppm fluoride toothpaste Consider recommending floss wands for 6E contacts if radiographs show early approximal caries on 6s
Diet	Provide advice at least once per year: • Restrict sugar to no more than 4 times per day • Drink only water or milk (preferably semi-skimmed or skimmed) between meals • Sugar-free snacks only • Nothing after brushing at night • Be aware of hidden sugars in food • Be aware of acid content of drinks	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of diet diaries Consider use of action planning
Topical fluorides	Apply fluoride varnish 2 times per year	Apply fluoride varnish an additional 1-2 times per year Consider the use of alcohol-free fluoride mouthwash
Fissure sealants		Fissure seal pits and fissures of all permanent teeth, including 7s Monitor existing sealants and top up if indicated Consider temporary GIC sealants for partially erupted 7s

Appendix 5
Supporting Tools

Caries Prevention Reminder		
Age 13 to 16 years	**Standard Prevention** For all children	**Enhanced Prevention** For children assessed as at increased caries risk, in addition to Standard Prevention
Assess	Child's ability and motivation Brushing practice Diet Changing caries risk Signs of erosion	
Occlusion	Consider necessity for ortho referral	
Radiographs	Bitewing radiographs, if not taken in previous 12-18 months	Bitewing radiographs, if not taken in previous 6-12 months
Motivation	Consider use of action planning	Consider contacting School Nurse for support Consider possible dental neglect
Toothbrushing	Provide advice at least once per year: • 2 minutes twice daily • Use 1350-1500 ppm fluoride paste • Spit, don't rinse • Brush 7s laterally • Hands on brushing instruction if not given previously	Provide Standard Prevention advice at each recall Hands on brushing instruction at least once a year Consider free brush and paste Consider toothbrushing charts Consider disclosing Consider prescribing 2800 ppm fluoride toothpaste Consider recommending floss wands for 6E contacts if radiographs show early approximal caries on 6s
Diet	Provide advice at least once per year: • Restrict sugar to no more than 4 times per day • Drink only water or milk (preferably semi-skimmed or skimmed) between meals • Sugar-free snacks only • Nothing after brushing at night • Be aware of hidden sugars in food • Be aware of acid content of drinks	Provide Standard Prevention advice at each recall Motivate and be positive and supportive Consider use of diet diaries Consider use of action planning
Topical fluorides	Apply fluoride varnish 2 times per year	Apply fluoride varnish an additional 1-2 times per year Consider the use of alcohol-free fluoride mouthwashes
Fissure sealants		Fissure seal pits and fissures of all permanent teeth,including 7s Monitor existing sealants and top up if indicated Consider temporary GIC sealants for partially erupted 7s

Appendix 5
Supporting Tools

A5.4 Template Letter for Health Visitor/School Nurse/General Medical Practitioner/Child Protection Advisor

This template letter can be adapted for use when contacting other agencies to request advice and multidisciplinary support in the ongoing dental health management of a child or when dental neglect is suspected. It is available to download from the SDCEP website.

Dental Practice Name:
Address:
Tel. No:

To:

Date: _____

Dear _____

Re: _____ D.O.B.: _____

Address: _____

_____

I understand the above child is under your continuing care am therefore writing to share my concern with you about their dental health and welfare.

Despite the provision of appropriate preventive advice, support and dental treatment availability, the parent/carer and child have not been able to effectively comply.

When the child was last assessed on ---(date)----- they had

- ---(number)----teeth that had experience of decay
- dentally related pain Yes/No
- dentally related sepsis Yes/No

The dental health areas of compliance causing concern are

Date(s)

- ☐ Fail to contact or attend our service for first visit _____
- ☐ Fail to attend for scheduled recall _____
- ☐ Fail to attend for scheduled care appointment _____
- ☐ Attended for emergency pain relief _____
- ☐ Required dental extraction/care under G.A. _____

I would be very grateful if you could provide the appropriate dental health support and intervention within your setting and also reinforce the importance of dental health maintenance and ongoing compliance with the dental care provision the child requires. I would be happy to arrange another appointment at their request and would welcome working with you on an ongoing basis to maintain this child's dental health.

Yours sincerely,

Dental Practitioner

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The Scottish Dental Clinical Effectiveness Programme (SDCEP) is an initiative of the National Dental Advisory Committee (NDAC) and is supported by the Scottish Government and NHS Education for Scotland. The Programme aims to provide user-friendly, evidence-based guidance for the dental profession in Scotland.

SDCEP guidance is designed to help the dental team provide improved care for patients by bringing together, in a structured manner, the best available information that is relevant to priority areas in dentistry, and presenting this information in a form that can be interpreted easily and implemented.

'Prevention and Management of Dental Caries in Children' aims to support the dental team to improve children's dental care and children's oral health. It presents clear and consistent practical advice for the delivery of preventive care and, when necessary, for management of caries.

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