Action plan There should be clear protocols and referral routes for follow-up at Birmingham Dental Hospital for oral health care provision on the diagnosis of cancer.
A dental care pathway will be formulated including: (i) children are seen by a dentist before commencing caner therapy to screen for dental disease; (ii) if the child is registered by a primary care dentist this can be done locally. It has been suggested an information leaflet be created for the patients to give to the primary care dentist concerned explaining the need for dental input; (iii) for those patients with no access to a primary care dentist a specific referral form has been designed to refer the patient to the dental specialities department at Birmingham Children's Hospital; and (iv) dental therapy should be in an ordered and planned fashion allowing the child to be dentally fit before commencing cancer therapy therefore reducing the risk of dental infection during this difficult time.
Further audit is recommended at Birmingham Children's Hospital once the recent changes to the primary care dental services have been fully implemented.

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An audit on the presence of a final working length recording for patients undergoing apexification

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Introduction Apexification is defined as a method to induce a calcified barrier in a root with an open apex or continued apical development of an incomplete root in teeth with necrotic pulp[1]. Calcium hydroxide is commonly used for this procedure.

Calcium hydroxide is an irritant if it extrudes beyond the canal. If the material is short within the canal the barrier can form in an undesired location. The location of the calcified barrier is determined by the level at which calcium hydroxide meets vital tissue capable of hard tissue formation. To avoid a hard tissue barrier forming inside the canal the operator should ensure that the entire length of the root canal is filled with calcium hydroxide.

We encountered a small number of patients in the trauma clinic with calcium hydroxide dressings in the canal that were 'less than ideal' which may have affected the outcome of treatment. The majority of these patients had calcium hydroxide placed in the canal without a radiographic working length being established. In teeth with incomplete root formation with a wide open apex, granulation tissue can grow into the root canal especially if there is insufficient calcium hydroxide in the canal. Therefore a periapical radiograph to determine working length is necessary at the start of treatment.

Aim The aim of this audit was to ensure that all patients undergoing apexification in the Department have a final working length recorded by the end of the second treatment appointment for apexification.

Standards

Criteria	Target	Exceptions	Source of evidence
Patients undergoing endodontic treatment in the Department of Paediatric Dentistry should have an established a working length prior to instrumentation	100%	Nil	Mackie *et al.*[2] (3) Strength B

Methods Data were collected retrospectively by the audit lead from case notes of patients who had non-vital permanent incisors with open apices. The patients were undergoing apexification in the Department of Paediatric Dentistry. Data were collected for the first 50 cases treated from January 2004 on a dedicated proforma (hppt://http://www.bspd.co.uk). The staff involved in treating these patients included senior house officers, postgraduate students, specialist registrars, lecturers and consultants.
Results Of the 50 patients included in the study, six did not have a working length established radiographically by the end of the second appointment. Of the six patients who did not have a radiographic working length, four were treated by a postgraduate student and the other two by specialist registrar or lecturer.
Discussion As mentioned earlier, it is essential that a final working length be established prior to instrumentation. The literature shows that the remnants of the Hertwig epithelial root sheath (HERS), under favourable conditions organize the apical mesodermal tissue into root components. Over-instrumentation can disrupt the HERS and affect barrier formation. Overfilling or under filling of the canal with calcium hydroxide can cause irritation or barrier formation in an undesirable location. Hence the importance of a definite working length cannot be over-emphasized. The current audit highlighted that the standard had not been achieved.
Action plan A flow chart outlining the steps involved in the process of apexification has been placed on clinic to ensure that all staff are reminded to obtain a final working length prior to instrumentation. Re-audit carried out after 1 year showed a marked improvement in compliance. Only one patient of 50 did not have a radiographic working length prior to instrumentation.

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Continuing health care in patients treated for childhood malignancies

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Introduction The oral cavity is a site where complications frequently develop as a direct result of the malignancy or as an unwanted effect of treatment[1]. In the United Kingdom there are approximately 1200 new cases of childhood cancer each year. Up to 90% of the paediatric oncology patients may suffer oral

complications with implications for quality of life during and after therapy[2]. Survival rates following cancer treatment have significantly improved in the last three decades. Dentists are increasingly likely to find that they have children in their care that may have been treated for malignant disease. At the Bristol Children's Hospital (BCH) the patients and parents/carers receive written advice regarding long-term effects of the anti-malignancy treatment they have received. However, patient information leaflets do not include advice regarding the current practices or warnings about the long-term dental effects of treatment.

Aim The current audit was carried out to ascertain the level of oral health knowledge and access to continuing oral health care for patients who have been treated for childhood malignancies at Bristol Children's Hospital.

Standards (i) Patients should have access to dental follow up after treatment for malignancy (NICE Guidelines, 2005)[3]; (ii) fluoride mouthwash should be used by patients over 6 years of age who are at high risk to caries (RCS Guidelines, 2004)[4]; and (iii) high fluoride containing toothpaste must be used by patients over 6 years of age who are at high risk to caries (BSPD publication, 1996)[5].

It was expected that the above standards should be met in 100% of the cases.

Methods A questionnaire relating to oral health awareness and current oral care practices was sent out to children who had undergone treatment for childhood malignancy at the Bristol Children's Hospital between the ages of 4 and 16 years and who were currently in remission. Of 125 questionnaires sent out, 40 were returned, of which 38 were included in the audit. Two questionnaires were excluded, as the forms were incomplete. A copy of the questionnaire is available at http://www.bspd.co.uk.

Results From the sample of 38 patients, six were 6 years of age or younger. Thirty-two children had assistance from their parents in completing the questionnaire. Twelve of thirty eight patients reported they had experienced problems with their teeth or gums as treatment for childhood malignancy had begun, of which five found it difficult to access dental care. Fifteen of thirty-two patients who were over 6 years old used high fluoride toothpaste and 4/32 used a fluoride mouthwash.

Only one patient had received information on the long-term effects of cancer treatment on his/her teeth and this was not provided by Bristol Children's Hospital.

Discussion These results suggest that the NICE and Royal College of Surgeons of England guidelines are not being followed for the children who are being treated for childhood malignancies at the Bristol Children's Hospital. Only one patient had received information on the effects on their oral health, and this was not from United Bristol Healthcare Trust. At least three of the children were not registered with a dentist. This audit shows that patients and their parents/carers do not have easy access to important information about oral health care.

Action plan An information leaflet containing information regarding oral hygiene practices, prevention of decay, monitoring and access to dental care has been produced, and is given all patients prior to discharge. Re-audit is planned after 1 year.

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A prospective audit of paediatric patients attending London Dental Hospitals with dento-alveolar trauma

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Introduction The purpose of this audit was to record the treatment carried for the management of dento-alveolar trauma by health care professionals compared to the gold standard of management as set out in local, national and international guidelines.

Aim The aim was to audit referrals made to the London Dental Hospitals, the source of the referrals and the management received up to the point of attending the dental units.

Standards (i) National guidelines: management and root canal treatment of non-vital immature permanent teeth[1]; treatment of avulsed permanent incisor teeth in children[2]; treatment of traumatically intruded permanent incisor teeth in children[3]; and (ii) International guidelines: Guidelines for the management of traumatic dental injuries I. Fractures and Luxations of permanent teeth[4] and Guidelines for the management of traumatic dental injuries II. Avulsions of permanent teeth [5].

Methods Over a 6-month period, children under the age of 16 years who were referred for the management of dento-alveolar trauma had details of their injuries and their management to date entered on a proforma. The types of injuries were classified into mild, moderate and severe for data analysis (Table 1). Data recorded included: delay in presentation, type of injury sustained, number of Health Care Professionals (HCP) seen and treatment received.

Results Eighty patients were audited of whom 29% were female and 71% male. Thirty-seven per cent of injuries were to primary teeth and 63% to the permanent dentition (Figs 1 and 2). The source of referral were; general dental practitioners = 55%, general medical practitioners = 4%, emergency dental service = 8%, hospital medical service = 24%, community dental service = 9%. Fifty-nine per cent of the injuries were seen in dental units within 24-hours further delay was between 24 and 3 months. The severities of the injuries as defined in Table 1 were mild (37%), moderate (28%) and severe (34%). Referral following

Table 1. Classification of dento-alveolar injuries according to severity[6].

Mild	Moderate	Severe
Enamel infraction	Complicated crown fracture	Complicated crown-root fracture
Enamel fracture	Uncomplicated crown-root fracture	Root fracture in cervical one-third
Enamel-dentine fracture	Root fracture in apical or middle one third without luxation of coronal fragment	Root fracture in middle or apical one-third with luxation of coronal fragment
Concussion	Subluxation (vertical movement)	Extrusion luxation
Subluxation (horizontal movement)		Intrusion luxation
		Lateral luxation
		Avulsions