

# Previous radiographic experience of children referred for dental extractions under general anaesthesia in the UK.

N.L. Young, H.D. Rodd and S.A. Craig

*Department of Oral Health and Development, School of Dentistry, Sheffield, U.K*

**Objective** To determine what proportion of children undergo radiographic assessment prior to referral to a dental hospital for extractions under general anaesthesia. **Basic research design** This prospective survey was conducted over a 6-month period. A data sheet was used to record the following information: patient's age; referrer's name and place of work (general dental practice or community dental service); teeth to be extracted (primary dentition and/or permanent dentition) and reported previous radiographic examination. Patients were excluded from the study if, following a clinical examination, radiographs were not actually deemed necessary for diagnosis and treatment planning purposes. **Clinical setting** A paediatric dentistry clinic within a dental hospital in the North of England. **Participants** 161 patients with a mean age of six years (SD= 2.2, range=3–14 years) who were referred to the dental hospital for extractions under general anaesthesia. **Results** Overall, 12.4% of children had reportedly undergone a previous radiographic assessment prior to hospital referral. A significantly greater proportion of children referred for permanent tooth extractions had been subject to radiographic examination compared to children referred for primary tooth extractions (46.2% as compared to 6.3%;  $P=0.001$  chi-squared test). Furthermore, patients referred from the community dental service were significantly more likely to have had previous dental radiographs than children referred from general dental practice (36.9% compared to 9.3%;  $P=0.003$  chi-squared test). **Conclusions** Radiographs do not appear to be routinely employed for caries diagnosis and treatment planning in young children within general dental practice in the UK.

*Key words:* Caries, children, general anaesthesia, radiographs

## Introduction

Regrettably, dental caries continues to be an extremely prevalent disease amongst British children. The 2003 survey of child dental health in England and Wales reported that 43% of 5-year-olds and 34% of 12-year-olds were affected by dental caries (Pitts and Harker, 2003). Furthermore, it would appear that there has been virtually no improvement in the caries experience of 5-year-olds over the last decade. Caries diagnosis and its related treatment thus represent a major component of dental care provision for children in the UK.

Evidence-based practice supports the use of posterior bitewing radiographs as an essential adjunct to clinical examination for caries diagnosis (Kidd and Pitts 1990). A policy document, published by the British Society of Paediatric Dentistry in 1997, stated that radiographs should be taken as soon as the cooperation of the child allows but particularly in pre-school children with high caries-risk (Nunn *et al.*, 1997). In the same year, a consensus view was reached amongst UK Consultant Paediatric Dentists to support the use of radiographs to detect approximal caries in the primary, mixed and permanent dentitions with closed contacts (Rogers and Hector, 1997). More recently, the European Association of Paediatric Dentistry published guidelines suggesting that 5-year-olds should be considered for bitewing radiographs for baseline caries assessment (Espelid *et al.*, 2003).

Despite recommendations from these expert groups, and robust evidence to support the value of radiographs for caries detection, they do not appear to be routinely employed for children in some dental settings. A survey of Scottish general dental practitioners found that only 72% of respondents actually used radiography as a caries diagnostic tool in children. Furthermore, only 17% stated that they would consider taking bitewing radiographs in children under the age of six years (Taylor and Macpherson, 2004).

Caries diagnosis is fundamental to good treatment planning, prompting appropriate preventive intervention for early lesions and facilitating decision-making for restorative care (Rodd and Wray, 2006). Accurate caries diagnosis assumes paramount importance where the decision has been made to carry out extractions under general anaesthesia (GA). In such cases, the referring clinician should have a comprehensive picture of the child's caries status to ensure all teeth of poor prognosis are considered in the extraction plan and to fully inform carers about the proposed number of extractions.

Therefore, the overall aim of this study was to determine what proportion of children, referred to a dental hospital for dental extractions under general anaesthesia (GA), had previously undergone a radiographic assessment, considered appropriate for caries diagnosis, with their referring practitioner.

## Method

The study population comprised all patients specifically referred to the Paediatric Dentistry Department of the Charles Clifford Dental Hospital, Sheffield, for dental extractions under GA. The survey was carried out prospectively over a 6-month period in 2004/5 as part of clinical audit within the unit. A standard data collection sheet was employed to record the following information: patient's age; referrer's name and place of work (general dental practice or community dental service); teeth to be extracted (primary dentition and/or permanent dentition), and reported previous radiographic examination. In cases where the accompanying adult did not know whether a radiograph had been previously taken, the dental practice was phoned to obtain this information. Furthermore, if radiographs had reportedly been taken, but not sent with the referral letter, the dentist was contacted to request these in order to avoid repeat radiographs in the hospital, and thus unnecessary exposure to ionising radiation.

Following clinical examination, if radiographic investigation was not considered to be necessary for caries diagnosis (and, where appropriate, assessment of the developing dentition, dental anomalies or other pathology) the patient was excluded from the study.

The data were entered and analysed using the Statistical Package for Social Sciences for Windows version 12 (SPSS Inc, Chicago, Illinois, USA). Analysis involved descriptive statistics and cross tabulations, with potential associations tested for statistical significance using Pearson's chi-squared tests. Significance levels were set at  $p < 0.05$ .

## Results

A total of 170 patients were seen by the investigators for a dental assessment following specific referral for extractions under GA, during the study period. Nine patients were excluded from the study, as radiographs were not deemed necessary for treatment planning. These subjects were all very young children with gross caries clinically evident in all primary molars.

The study group thus comprised 161 patients with a mean age of six years ( $SD = 2.2$ , range=3-14 years). The referrers included 101 different dentists: 88.1% ( $n=89$ ) worked in general dental practice and 11.9% ( $n=12$ ) worked within the community dental service. The vast majority of children (84.5%,  $n=136$ ) had been referred solely for extractions of the primary dentition. The remaining 15.5% ( $n=25$ ) had been referred for extractions involving permanent teeth ( $\pm$  primary teeth).

Overall, only 12.4% ( $n=20$ ) of these children had undergone prior radiographic assessment. It was found that children referred for permanent tooth extractions were significantly more likely to have had previous radiographs than children referred only for extractions of the primary dentition (46.2% versus 6.3%;  $p < 0.001$ , chi-squared test). A further significant difference in previous radiographic experience was identified according to the type of referrer. Patients referred from the community dental service were statistically more likely to have had previous dental radiographs than those referred from general dental practice (9.3% versus 36.9%;  $p = 0.003$ , chi-squared test).

## Discussion

There is indisputable evidence to support the value of bitewing radiographs in caries diagnosis (Murray and Majid, 1978; Kidd and Pitts, 1990; Clark and Curzon, 2004; Anderson *et al.*, 2005). Notably, the use of bitewing radiographs has been found to increase the number of approximal lesions detected (compared to clinical examination alone) by a factor of between two and eight (Kidd and Pitts, 1990). It has been suggested that, without the aid of bitewings, approximately two thirds of carious lesions in primary molars would remain undetected (Murray and Majid, 1978). Anderson *et al.* (2005) recently demonstrated a sizeable gain from bitewing examination in detecting approximal caries in 5-year-olds. Furthermore, a comprehensive review of 29 published studies found that bitewing radiographs were essential for approximal caries detection in posterior teeth as clinical examination alone would miss over 50% of these lesions (Kidd and Pitts, 1990). It is not surprising therefore, that paediatric dentists have advised that every effort should be made to take bitewing radiographs in a child with any clinical sign of caries (Clark and Curzon, 2004). In young patients who are unable to tolerate intra-oral films, the lateral oblique radiograph provides an acceptable alternative (Rodd and Wray, 2006).

The findings of the present study are thus of clinical concern, in that so few practitioners appear to routinely use radiographs for caries diagnosis, particularly in the primary dentition. One has to question why, in the face of such overwhelming evidence to support the use of radiographs, general dental practitioners rarely take advantage of this diagnostic aid? Possible barriers may include: a lack of knowledge about the usefulness of radiographs in a young population; competence and confidence issues in treating children; inadequate remuneration, and safety concerns about ionising radiation. Interestingly, a previous study has reported that only 12% of general dental practitioners perceived bitewing radiographs to be a useful guide for restorative treatment of approximately detected dentinal caries in primary teeth (Taylor and Macpherson, 2004). Undoubtedly, efforts should be made to gain greater insight into these issues and strategies instigated to promote the appropriate use of radiographs for caries diagnosis in children.

Regrettably, there will always be some children who require referral for extractions under GA. In such cases, it is the duty of the referring practitioner to provide the child and carer with sufficient information to make an informed decision about treatment options (Department of Health, 2000). This information should include the likely number of required extractions or restorations based on thorough clinical and radiographic findings. It is the authors' impression that, following hospital referral, the finding of many more carious teeth than has been previously indicated by the referring dentist, is a cause of upset to many parents. Furthermore, a recent study identified that repeat general anaesthetics for dental extractions were more common for children where there had been no radiographs available at the time of the first GA assessment (Albadri *et al.*, 2006). This finding again highlights the invaluable role of radiographs in the overall care of the young dental patient.

## Conclusions

Findings from the present study would suggest that dental radiographs are not being routinely utilised for caries diagnosis in children within general dental practice. Without the benefit of these special investigations, diagnostic and treatment planning standards are undoubtedly compromised.

## References

- Albadri, S., Jarad F., Lee G. and Mackie . (2006): The frequency of repeat general anaesthesia for teeth extractions in children. *International Journal of Paediatric Dentistry* **16**: 45-48.
- Anderson, M., Stecksén, C., Stenlund, H., Rangard, L., Tsilingaridis, G. and Mejare, I. (2005): Detection of approximal caries in 5-year-old Swedish children. *Caries Research* **39**, 92-99.
- Clark, H. and Curzon, M. (2004): A prospective comparison between findings from a clinical examination and results of bitewing and panoramic radiographs for dental caries diagnosis in children. *European Journal Paediatric Dentistry* **4**, 203-209.
- Department of Health (England) (July 2000): a conscious decision – a review of the use of general anaesthesia and conscious sedation in primary dental care. “[http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4074702](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4074702) (accessed 20 October, 2008).”
- Espelid, I., Mejare, I. and Weerheijm, K. (2003): EAPD guidelines for use of radiographs in children. *European Journal of Paediatric Dentistry* **4**, 40-47.
- Kidd, E. and Pitts, N. (1990): A reappraisal of the value of the bitewing radiograph in the diagnosis of posterior approximal caries. *British Dental Journal* **169**, 195-200.
- Murray, J. and Majid, Z. (1978): The prevalence and progression of approximal caries in the deciduous dentition in British children. *British Dental Journal* **145**, 161-164.
- Nunn, J., Crawford, P., Page, J., and Winder, G. (1997): British Society of Paediatric Dentistry: a policy document on the dental needs of children. *International Journal of Paediatric Dentistry* **7**, 203-207.
- Pitts, N. and Harker, R. (2003): Obvious decay experience. In: children’s dental health in the United Kingdom 2003. [WWW.dh.gov.uk/publicationsandstatistics](http://www.dh.gov.uk/publicationsandstatistics).
- Rodd, H. and Wray, A. (2006). Treatment planning for the developing dentition. pp 12-13. London: Quintessence Publishing Co. Ltd.
- Rogers, C. and Hector, M. (1997): The establishment of current opinion within consultants in paediatric dentistry in the UK for the taking of dental radiographs of children. *International Journal of Paediatric Dentistry* **7**, 191-198.
- Taylor, G. and Macpherson, L. (2004): An investigation into the use of bitewing radiography in children in Greater Glasgow. *British Dental Journal* **196**, 563-568.