

## IN BRIEF

- There must be clear justification for a child to have teeth extracted under general anaesthesia.
- Referrals should comply with the recommendations made by the General Dental Council in *Maintaining Standards*.
- It is difficult to justify orthodontic extractions made under general anaesthesia.

# The development of referral guidelines for dentists referring children for extractions under general anaesthesia

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**Objective** To develop a set of guidelines for referral of children for simple extractions under general anaesthesia and to determine if services providing general anaesthetic extractions comply with the guidelines.

**Design** The guidelines were developed with reference to published literature and experts in the field. Patient's records were used to determine the compliance with the guidelines.

**Setting** Community dental services in the North West of England in 2000.

**Subjects** One hundred and ninety six sets of patient records of children attending to have teeth extracted under general anaesthesia were studied.

**Results** The mean age of the 196 children was 6.8 years (SD = 2.5 years) and ranged from 2.7 to 15.8 years. Caries was the prime reason for extractions (182; 93%). Of the 196 children who received a general anaesthetic, 103 (53%) dentists had complied with the general anaesthetic referral guidelines whilst 93 (47%) had not. There was wide variation in compliance across 11 trusts in the North West of England. The lowest compliance was 25% and the highest 93%.

**Conclusion** This study has demonstrated that there can be considerable agreement amongst a group of experts on what constitutes clear justification for extracting teeth under general anaesthesia. However there can be marked variation in compliance with these guidelines.

In 1998 the General Dental Council<sup>1</sup> (GDC) approved changes to its ethical guidance in respect of resuscitation, sedation and general anaesthesia. These changes took immediate effect and were incorporated into *Maintaining Standards*, the Council's guidance to dentists on all aspects of professional and personal conduct. The GDC reiterated earlier guidance that general anaesthesia is a procedure which is never without risk. It also stressed that general anaesthesia should only be considered if there is an over-riding clinical need and the alternative methods of pain control have been discussed with the patient.

The Department of Health,<sup>2</sup> through its circular *A conscious decision* ensured that the availability of dental treatment under general anaesthesia would be greatly reduced, especially in general dental practice. This meant that there would be an appreciable impact on patient services. However, the GDC considered such changes to be in the best interest of patients.

The GDC went on to clarify the roles of the referring dentist and the treating dentist in relation to treatment under general anaesthesia. The duties of the referring dentist included that a thorough and clear explanation of the risks involved and the alternative methods of pain control be given to the patient before the agreement to refer is made. Clear justification for the use of general anaesthesia had to be contained within a referral letter. The treating dentist, before carrying out treatment under general anaesthesia had also to give a thorough and clear explanation of the risks involved and of alternative methods of pain control.

A number of studies have been published reporting the factors that influence the decision to prescribe a dental general anaesthetic. These influences include young age, poor patient cooperation, fear and anxiety, need for multiple extractions, acute infection, medical conditions and orthodontics.<sup>3</sup> Also poor cooperation during previous restorative treatment and anticipated difficult extractions can be included.<sup>4</sup>

The first aim of this study was to develop a set of guidelines for referral of children for simple extractions under dental general anaesthesia. The second aim was to assess services providing general anaesthetic extractions for children to determine their compliance with the general anaesthetic referral guidelines.

## METHOD

### Development of the referral guidelines

The first step was to produce a draft set of referral guidelines from relevant published literature. A *Medline* search was conducted using key words including general anaesthesia, inhalation sedation, dentistry and extractions. The search identified relevant research papers and reports. In addition, locally produced trust guidelines were consulted. The 14 trusts in the North West (East) Region of England, which provided a general anaesthetic extraction service for children, were asked to provide their printed guidelines for their service. These were provided by eight of the trusts.

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The second step was to distribute this draft set of referral guidelines to 20 selected experts who were asked their opinions by means of a questionnaire. The experts included authors of papers published in the UK from 1990 to 1998 which were specifically concerned with the use of general anaesthesia and community dental service dentists employed within the North West region of England who had undertaken research projects in the use of general anaesthesia/inhalation sedation since 1990. The questionnaire was designed to determine the experts' agreements and disagreements on the draft set of referral guidelines.

The results of the questionnaires were tabulated and individual comments collated. Where expert opinion was divided, a consensus view was taken. This draft set of referral guidelines was modified, in light of this expert opinion, to produce the final general anaesthetic referral guidelines.

Measurement of compliance with the general anaesthetic referral guidelines

One of the authors (MC) or a community dental nurse with experience in the provision of treatment under general anaesthesia, trained by the author (MC), visited 11 trusts in the North West of England. They attended general dental anaesthetic sessions and with relevant permission, examined the patients' dental records for all the children who were to have a general anaesthetic. Where necessary, the dental officer providing the treatment under general anaesthesia was interviewed.

Data were recorded, using a standardised data collection sheet to assess the overall compliance with the general anaesthetic referral guidelines. Patient confidentiality was preserved.

A chi square test of significance 0.05, a power of 80% and an estimated standard deviation of 20 required a total sample size of 129.

Data processing and statistical analysis was carried out using SPSS.

RESULTS

Production of the general anaesthetic referral guidelines

Twenty experts were approached, one received two questionnaires addressed to her maiden and married names. One expert declined to take part in the survey and one did not reply. Thus of the 19 experts, 17 (89%) completed the questionnaire.

The questionnaire contained six questions.

Question 1. Do you agree that the selection procedure fairly reflects the recent GDC guidelines?

A majority of experts, 10 (59%) agreed that the selection procedure did fairly reflect the GDC guidelines whilst 5 (30%) did not. Two (11%) did not reply to this question.

Question 2. Do you agree with the initial criteria?

All the 17 experts expressed opinions; the majority agreeing with the criteria and with over three quarters of the experts agreeing with four of the criteria. Table 1 shows the agreement of the experts with each of the proposed initial criteria.

Table 1 The responses of the experts regarding the initial criteria for the draft set of referral guidelines

Initial criteria	Agreement N (%)	Disagreement N (%)
Child less than 3 years of age	10 (59)	7 (41)
Child intellectually impaired, unable to communicate	13 (77)	4 (23)
Child allergic to local anaesthetic	14 (82)	3 (18)
Child and dentist do not share a common language	7 (41)	10 (59)
Acute soft tissue swelling precluding use of local anaesthetic	13 (77)	4 (23)
Symptomatic teeth in more than 2 quadrants	13 (77)	4 (23)

The first initial criterion 'The child is less than three years of age' was agreed by 10 (59%) of the experts whilst 7 (41%) did not agree with this age. Of those 7 disagreeing, 4 thought the age should be greater than three, with ranges between four to seven years suggested. On the other hand, 2 experts thought it should be less.

In the final version of the referral guidelines the age was increased from three to four years.

The second initial criterion 'The child is intellectually impaired and unable to communicate effectively' was agreed by 13 (77%) of experts and so no change was made.

The third initial criterion 'The child has an allergy to local anaesthetic' was agreed by 14 (82%) of the experts and so no change was made.

The fourth initial criterion 'The child and dentist do not share a common language' had the majority of experts 10 (59%) disagreeing with the criteria whilst 7 (41%) agreed. The experts who disagreed expressed a concern that services should be provided such that language did not present a barrier to treatment. In view of the expert opinion this initial criterion was not included in the final version of the referral guidelines.

The fifth initial criterion 'An acute soft tissue swelling is associated with teeth needing extraction, precluding the use of local anaesthetic' was agreed by 13 (77%) of the experts so no change was made.

The sixth initial criterion 'There are symptomatic teeth causing pain in more than two quadrants or two quadrants necessitating the use of bilateral inferior dental blocks' was agreed by 13 (77%) of the experts so no change was made to the criterion.

Question 3. 'Do you consider that there are other indications for direct referral to general anaesthesia?'

Other indications were suggested by 9 (53%) of the experts. Medical conditions were mentioned by 6 and poor cooperation by 3. These were not included in the final version of the referral guidelines. Many of the medical conditions mentioned would have necessitated treatment as an inpatient in a children's hospital and thus were not appropriate for these guidelines.

Question 4. 'Do you agree that patient/parent preference and multi quadrant carious teeth are not alone sufficient justification for general anaesthesia?'

Agreement was expressed by 14 (82%) of the experts whilst 3 (18%) disagreed.

Question 5. 'Do you agree that general anaesthesia is not justified for orthodontic extractions unless one or more of the initial criteria apply?'

This question showed the highest agreement with 16 (94%) of the experts agreeing and only 1 disagreeing.

Question 6. 'Do you agree that treatment with local anaesthesia, with or without inhalation sedation, should always be attempted prior to referral to general anaesthesia, unless one or more initial criteria apply?'

Agreement was expressed by 10 (59%) of the experts whilst 7 (41%) disagreed. It was decided not to alter this part of the referral guidelines, but keep with the majority opinion.

The draft referral guidelines were thus modified to produce the final general anaesthesia referral guidelines which is given in Figure 1.

Compliance with the general anaesthesia referral guidelines

Across the 11 trusts a total of 196 sets of children's records were included. The mean age of the children was 6.8 years (SD = 2.5 years) and ranged from 2.7 to 15.8 years.

**Guidelines for dentists referring children for simple extractions under general anaesthesia.**

1. The initial written diagnosis must summarise the reason(s) for the extraction(s).
  - 1.1 Caries causing symptoms.
  - 1.2 Trauma causing symptoms.
  - 1.3 Orthodontic problem needing space.
  - 1.4 Other specified reason.
2. Initial criteria – where one or more of these five initial criteria apply to a child, the use of dental general anaesthesia can be justified.
  - 2.1 The child is less than 4 years of age.
  - 2.2 The child is intellectually impaired and/or unable to communicate effectively.
  - 2.3 The child has an allergy to local anaesthetic.
  - 2.4 An urgent extraction is needed in the presence of acute soft tissue swelling precluding the use of local anaesthesia.
  - 2.5 There are several teeth causing pain in more than two quadrants or in two quadrants necessitating the use of bilateral inferior dental blocks.
3. The following two criteria do not justify the use of general anaesthesia in the absence of the initial criteria listed above in 2.
  - 3.1 Patient/parent preference except when inhalation sedation has already been tried.
  - 3.2 The presence of carious but asymptomatic teeth.
4. When none of the initial criteria listed in 2 apply, treatment should be attempted with local anaesthesia, supported by inhalation sedation when this is available. General anaesthesia would then be justified for the child who could not be treated with this method.
5. Orthodontic extractions of sound teeth under general anaesthesia can only be justified for intellectually impaired patients.

**Figure 1** General anaesthetic referral guidelines

The majority of children, 162 (83%) had had an assessment visit prior to the day of the general anaesthetic although 34 (17%) were assessed on the actual day.

Caries was the prime reason for extractions (182; 93%), with only a small number of extractions being undertaken for trauma (5; 3%) and orthodontics (8; 4%). There was 1 child where the teeth were extracted because of hypoplasia.

All the 11 trusts which provided a GA extraction service also provided inhalation sedation services. Thus compliance with the referral guidelines could be through the following methods:-

- If the child satisfied one or more of the initial criteria.
- If the child did not satisfy any of the initial criteria but treatment with inhalation sedation had been attempted.

Therefore non compliance occurred if the child did not satisfy any of the initial criteria and treatment with inhalation sedation had not been attempted prior to the decision to employ general anaesthesia.

Of the 196 children, 101 (52%) satisfied one or more of the initial criteria and thus no further selection was required. This meant that 95 (48%) did not have one of the initial criteria, thus to comply with the referral guidelines, they should have had treatment attempted with an alternative before actually receiving their extractions under a general anaesthetic. As all the trusts provided inhalation sedation services, treatment with inhalation sedation should ideally have been attempted for compliance, but this was offered in only 2 cases (1%).

Of the 196 children who received a general anaesthetic, 103 (53%) of referrals had complied with the referral guidelines whilst 93 (47%) had not.

**Patient age and compliance**

The ages of children that achieved compliance and of those that did not are reported in Table 2.

The mean age of those with compliance was 6.4 years (minimum 2.7 years, maximum 15.8 years, standard deviation 2.67).

The mean age of those with non-compliance was 7.2 years (minimum 4.1 years, maximum 13.12 years, standard deviation 2.13 years).

The age criterion specified automatic compliance if the child was below 4 years of age. Selecting the children of four or more years allowed comparison of the mean ages of the children with compliance and those with non-compliance and to test if age had any influence upon the selection for general anaesthesia in the older child.

There was no significant difference between the compliance mean age of 7.1 years and the non-compliance mean age of 7.2 years ( $p=0.716$ ) as confirmed in Table 3.

**Table 2** The age of children which have compliance or non-compliance with the referral guidelines

	Number	Mean age in years	Minimum age in years	Maximum age in years	Standard deviation
Compliance	103	6.4	2.7	15.8	2.67
Non-compliance	93	7.2	4.1	13.1	2.13

**Table 3** The comparison of the mean ages of children (4 years of age or above) with compliance and those with non-compliance

	Number	Mean age in years	Standard deviation	t-value (df=716)	p-value
Compliance	85	7.1	2.49	-0.365	0.716
Non-compliance	93	7.2	2.13		

Independent sample t-test

**Table 4** The relationship between the compliance rates for children pre-assessed and assessed on the day of their general anaesthetic (percentages in parentheses)

	Number of:		Total
	Pre-assessed	Assessed on day of GA	
Compliance	89 (54.9)	14 (41.2)	103 (52.6)
Non-compliance	73 (45.1)	20 (58.8)	93 (47.4)
Total	162 (100)	34 (100)	196 (100)

$\chi^2 = 2.13$  1 D.F.  $p = 0.14$

### Patient pre-assessment and compliance

The relationship between the compliance rates of those children pre-assessed and those assessed on the day of the general anaesthetic were analyzed and the figures are given in Table 4. Of the 162 children who were pre-assessed, 89 (54.9%) had compliance whereas of those 34 children assessed on the day 14 (41.2%) had compliance.

There was no statistically significant differences for children pre-assessed compared with those assessed on the day.

### Trust variation

The compliance rate for each of the 11 trusts against the referral guidelines were considered separately (Table 5). There was a wide variation in compliance status. The lowest compliance was 25%. The highest was 93%. The mean compliance was 52% (SD = 25%).

### DISCUSSION

The mean age of children undergoing extractions under a general anaesthetic in this study was 6.8 years (range 2.7 to 15.8 years, standard deviation 2.5 years). This compares with that of previous studies. A study of referrals to a general anaesthetic service in Northern Ireland, reported a mean age of 6.8 years (range 3 to 17 years) for children receiving a dental general anaesthetic for the purpose of extractions.<sup>4</sup> Meanwhile, a study of a dental general anaesthetic service of the community dental service in East Kent, reported a mean age for children of 7 years.<sup>3</sup>

The North West region is an area where children have one of the highest caries rates within the UK.<sup>5</sup> These children often require extractions to control pain or infection. Of the children requiring extractions under general anaesthesia, the stated primary reason for the referral was caries (93%). This is comparable with the findings of other published studies. Holt *et al*<sup>6</sup> studied the use of general anaesthesia for tooth extraction in children in London and reported that 86% of children underwent extractions as a result of caries. Landes and Bradnock<sup>7</sup> in a study of demand for dental extractions performed under general anaesthesia for children by Leicester community dental service, reported that 94% of referrals were for caries. MacCormack and Kinirons<sup>4</sup> also reported that 94% were due primarily to caries.

The appropriateness of the use of general anaesthesia for orthodontic extractions has come into question with the publication of a number of studies reporting very high success rates for the alternative use of local anaesthesia supported by inhalation sedation. Shepherd and Hill<sup>8</sup> reported that 96.7% of children requiring orthodontic extractions could be successfully treated without recourse to general anaesthesia. This has been mirrored in another study which reported that 90% of patients could be treated by alternative means.<sup>9</sup>

This study found that 4.1% of children were referred for extractions primarily for orthodontic reasons. This compares favourably with previous studies, where rates of referral for orthodontic purposes ranged from 4.2%<sup>7</sup> and 16%.<sup>4</sup>

**Table 5** Compliance of each of the 11 trusts with the referral guidelines

Trust	Percentage compliance
A	60
B	65
C	27
D	35
E	33
F	25
G	39
H	93
I	90
J	33
K	71

This reluctance for the use of general anaesthesia for orthodontic extractions was reflected in the development of the referral guidelines, when 94.1% of experts expressed the opinion that orthodontic extractions under general anaesthesia were not justified unless one or more of the initial criteria applied.

The compliance rate for the children with the referral guidelines was 53%. This compliance was mostly (52%) achieved by the first method, through satisfaction of one or more of the initial criteria. Few (1%) of the children who did not satisfy the initial criteria went on to comply by the second method, by attempted treatment with inhalation sedation.

The overall compliance rates for individual trusts ranged from 25% to 93%. The reasons for this variation could not be determined in this study but require further investigation. These referral guidelines provide an opportunity for centres which still provide dental general anaesthetic extraction services to conduct their own audits.

It had been anticipated that the age of the child would influence compliance with the referral guidelines. There had been a lack of expert agreement over the initial criterion with respect to the age at which a child may have the maturity and degree of cooperation required for acceptance of treatment with local anaesthetic or inhalation sedation. Experts suggested ages from two to seven years as appropriate for referral directly to general anaesthesia. It was anticipated that this variation in opinion would have been shared amongst the operating dentists in the trusts. It was thought that there may have been a reluctance by some dentists to attempt treatment with local anaesthesia and a preference to refer younger children directly to general anaesthesia.

The age criterion specified automatic compliance if the child was below four years of age. Selecting the children of four years of age or more allowed comparison of the mean age and compliance. No significant difference was found in this study for the influence of the age on compliance and therefore age did not appear to influence the decision to prescribe dental general anaesthesia.

The decision to prescribe treatment with general anaesthesia for a child can be made at a pre-assessment session (a session prior to the day of the general anaesthetic) or at the general anaesthetic session.

A study was undertaken to assess the role of pre-general anaesthetic assessments for patients referred by general practitioners to Leicester community dental service.<sup>10</sup> It was reported that pre-general anaesthetic assessments reduced the number of patients undergoing general anaesthesia by 15%. For those patients, either alternative treatment was prescribed or it was decided that no active treatment was required.

All of the trusts operated pre-general anaesthetic assessment sessions and the majority of children (82.7%) were assessed by this method. Assessment on the day of the anaesthetic session was also undertaken in some trusts and the remaining children (17.3%) were assessed by this method.

When children attend for assessment at the general anaesthetic session, prepared and starved, it may be more difficult to deny

them treatment by this means or persuade parents and children of the benefits of alternative treatments. Thus, it was anticipated that children, whose need for treatment under general anaesthesia was determined at a pre-assessment session, would have greater compliance with the referral guidelines than those assessed at the general anaesthetic session. However, in this study, no significant association was found when the compliance rate of those children assessed at a pre-assessment was compared with that of those assessed on the day of the anaesthetic. Thus, the method of assessment did not appear to influence the decision to prescribe treatment with general anaesthesia.

## CONCLUSION

The General Dental Council in its document *Maintaining Standards* stresses that there must be clear justification for the use of general anaesthesia. It is incumbent upon both the referring dentist and on the dentist carrying out the treatment under general anaesthesia to ensure that there is clear justification for its use and other alternatives are not possible or in the child's best interest.

This study has demonstrated that there can be agreement amongst dentists on what constitutes clear justification for general anaesthesia, as shown by the responses to the initial criteria. In

addition there was marked variation across trusts in the same region on compliance to a set of referral guidelines for carrying out treatment under general anaesthesia.

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