

The success of inhalation sedation for comprehensive dental care within the Community Dental Service

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Summary. *Objectives.* To assess the outcomes of treatment with nitrous oxide/oxygen inhalation sedation (IS). To relate these to the age and previous dental experience of the child and the experience of the operator. To provide base-line information and identify training needs.

Methods. A retrospective examination of the clinical records of all children treated with IS within the Community Dental Service of Harrow and Hillingdon NHS Trust (HHHT) over a 3-month period was made. Personal details and previous dental experience were recorded. The outcome of the planned treatment was identified.

Results. Two hundred and eleven sets of records were reviewed from eight clinicians. The average age of the children was 7.2 years. Treatment plans were successfully completed in 83.9% of cases. Records showed that 18.5% of the children had previously had general anaesthesia (GA) for dental treatment, 27.5% had received IS and 5.2% had no previous dental experience. Of the 'failed' treatments, 50% were under 7 years of age and 31.3% were referred for GA. There was no difference in the proportion of failures in relation to the experience of the operator.

Conclusion. This review shows that inhalation sedation with nitrous oxide/oxygen is a very successful adjunct to the clinical management of children within the Community Dental Service.

Introduction

There have been a number of changes in the provision of GA for dental treatment in the General and Community Dental Services over the past few years. As a result of the Poswillo report [1] and the General Dental Council Guidelines [2], dentists can no longer provide general anaesthesia (GA) within the practice. The Poswillo report recommended that 'sedation be used in preference to general anaesthesia wherever possible'. An increasing number of children with complex dental needs or behaviour management problems are therefore being referred to the Community Dental Service (CDS) for treatment. Many children respond well to the use of inhalation sedation (IS) in combination with local anaesthesia

(LA) as a safe alternative to GA [3–6]. A study of children receiving IS and LA for dental extractions within the CDS in 1990 reported that 51 out of 62 children (87%) accepted this form of treatment [7]. A prospective study carried out in the hospital dental service showed a 90% success rate for children undergoing extractions and minor oral surgery with IS and LA [8]. The completion of a treatment plan spanning several visits under IS/LA has been reported in a few studies. Nathan *et al.* in 1988 concluded that nitrous oxide facilitates coping at subsequent visits, although it did not overcome severe anxiety and uncooperative behaviour [9]. Children choosing IS as opposed to GA for extractions demonstrated less psychological distress, and may therefore be more likely to exhibit less anxious behaviour at subsequent visits [10–13].

Specialists in paediatric dentistry, along with the majority of the dental officers within the Community

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Dental Service of Harrow and Hillingdon NHS Trust are routinely providing comprehensive treatment for children with IS/LA. The selection of suitable patients, their dental experience, the type, and amount of treatment attempted and the experience of the operator may all influence the outcome of the treatment [14]. At the time of this study, there are no guidelines for the use of conscious sedation in paediatric dentistry, or for the selection of patients in relation to the outcome of care.

The aim of this retrospective study was to investigate the clinical care of children requiring dental treatment under IS in the CDS. The outcomes of treatment related to: age of child; previous dental experience; type and complexity of treatment; and experience of the operator were measured. The outcomes would identify those cases where IS was likely to be inappropriate, as well as identifying specific training needs of clinicians.

Methods

All children receiving IS for dental treatment from Senior Dental Officers and Clinical Dental Officers within a 3-month period within HHHT were identified.

The information for each child was transferred from the clinical notes onto data collection sheets (Table 1). The treatment outcomes were recorded as shown in Table 2. From the data collected, the following were calculated: the total number of children receiving IS in that 3-month period; the average age of the children treated; the gender distribution; the average number of IS patients seen per dentist and the overall range treated by all dentists; the percentage of treatments completed as planned; and the average number of teeth restored and extracted per child.

Table 1. Data collected from the clinical notes.

| | |
|---------------------------------|---|
| Personal details: age, gender | |
| Number of teeth to be restored | |
| Number of teeth to be extracted | |
| Previous dental experience: | Check up only |
| | Restorations without local anaesthesia (LA) |
| | Restorations with LA |
| | Extractions with LA |
| | Restorations with LA and IS |
| | Extractions with LA and IS |
| | Restorations with GA |
| | Extractions with GA |

Table 2. The treatment outcomes collected from the clinical notes.

| |
|--|
| Treatment completed as planned |
| Modified treatment completed |
| Treatment abandoned and the child referred on to: |
| (a) Specialist for further inhalation sedation |
| (b) Specialist for treatment under general anaesthesia |
| If treatment was abandoned, what had been achieved (i.e. at what stage of treatment) |
| (a) Accepted nasal hood |
| (b) Accepted prophylaxis |
| (c) Accepted LA |
| Child failed to return to complete treatment |

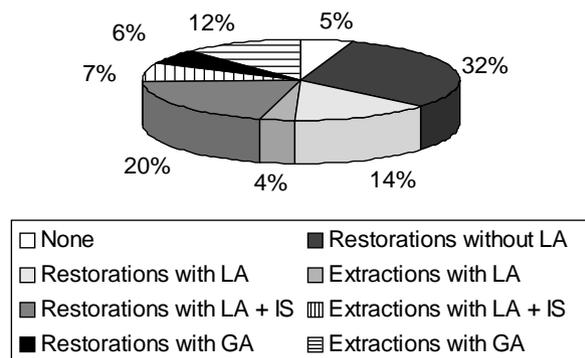


Fig. 1. Previous treatment experience of the children.

It was also possible to calculate for each dentist: the total number of children receiving IS in that 3-month period; the average age of the children treated; the average number of visits for IS per child; the total number of failed treatments; the total number of modified treatments completed; the total number of planned treatments completed; the total number of children who failed to return for completion of treatment; and the percentage of treatments abandoned or modified.

Previous dental experience was recorded as percentages of the total number of children treated, and this is represented in the diagram in Fig. 1.

The children for whom the treatment had been abandoned or modified were then specifically identified to see if there was any correlation with their age or previous dental experience. The data were then entered onto a database and analysed in Statistical Package for Social Science (SPSS).

Results

All the clinical records of the children in this study showed clear treatment plans and outcomes of treatment. A total of 211 children attended for 602

Table 3. Retrospective treatment data.

| | |
|--|-------------|
| Total number of children | 211 |
| Average age of the children treated (years) | 7.2 |
| Percent male | 51.2% |
| Average number of IS patients seen per dentist (range) | 26.4 (3–52) |
| Average number of IS visits per child (range) | 2.9 (1–9) |
| Average number of teeth restored per child | 3.1 |
| Average number of teeth extracted per child | 1.4 |

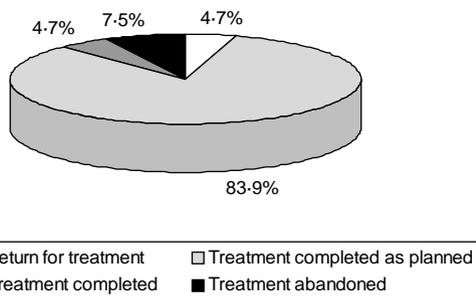


Fig. 2. Outcomes of treatment with IS.

visits for IS administered by eight dentists, between 1st April and 30th June 2000 (Table 3). The average age of the children was 7.2 years, with the majority in the range of 5–8 years inclusive, and 51.2% were male and 48.8% female. A total of 649 teeth were restored and 299 extracted. The average number of teeth restored per child was 3.1, and the average number of teeth extracted per child was 1.4.

The treatment outcomes are represented in Fig. 2. The majority of treatment was completed as planned (83.9%). A modified treatment plan was completed in ten children (4.7%) and a further ten children failed to return for completion of treatment. Treatment with inhalation sedation was abandoned completely in 16 children (7.5% of the total number) (Fig. 3). Ten (62.5%) of these had experienced some previous dental treatment and eight (50%) were less than 7 years old. Only five children were referred for completion of treatment under general anaesthesia. This represents 2.4% of the original total number of children treated over the 3-month period.

Discussion

A 3-month period gave a sufficient number of records for a realistic appraisal of the service. The majority of children treated with inhalation sedation were between 5 and 8 years (inclusive). This is not unexpected, as younger children are more likely to

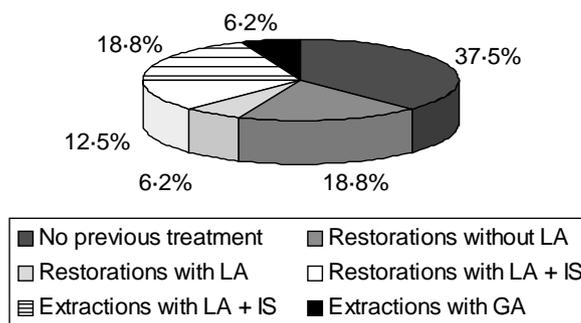


Fig. 3. Previous dental treatment of the 16 (7.5%) children whose treatment was abandoned.

require general anaesthetic, while older children may accept treatment with local anaesthetic only.

The treatment was completed as planned in 83.9% of cases. This is a very encouraging result, indicating that the children responded well to this form of treatment, and that the operators were generally proficient at planning the treatment and providing the sedation. This compares favourably with other reported success rates [3,4]. The treatment was abandoned in only 7.5% of cases (16 children). For each individual dentist the failure rate ranged from 0 to 13.2%. There was no correlation between the percentage of failures and the experience of the dentist. This suggests that individual dentists were selecting their cases appropriately. The high percentage of failures from one of the specialists may indicate that they were treating the more demanding cases. The two dentists who had no failures were treating relatively few cases (3 and 11).

One of the non-specialists had treated significantly more children with inhalation sedation than the other non-specialists and indeed a similar number to two of the specialists. This could indicate that the other non-specialists were treating more children who did not require IS, or were less experienced and more reluctant to use IS than their non-specialist colleagues. The latter issue needs to be investigated further as there appears to be a training need in relation to IS.

Thirty-nine (18.5%) of the children had experienced general anaesthesia previously for either restorations or extractions (Fig. 1). By providing inhalation sedation for their treatment, we have not only avoided GA in these children for the episodes of treatment reported here, but hopefully for the rest of their lives. Treatment was successfully completed with IS in 38 of 39 children who had previously had

GA for dental treatment. A second episode of GA was therefore avoided in 97.4% of these children.

In summary, large numbers of restorations and extractions using IS were provided for 211 children over a 3-month period. These cases were appropriate for care within the Community Dental Service and with the continued reduction in facilities for GA, the CDS will continue to receive an increased number of such referrals. Many of these children will be able to accept treatment with the use of IS. It is important that facilities for IS within the CDS are provided to meet the demand that cannot be met by the Hospital and Teaching institutions. This has resource implications both financially and in terms of time and the training of community dental officers.

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Résumé. *Objectifs.* Evaluer les résultats des traitements avec sédation par protoxyde d'azote/oxygène (IS). Relier ceux-ci à l'âge et aux expériences dentaires précédentes de l'enfant et à l'expérience de l'opérateur. Amener des données de base et identifier les besoins en formation.

Méthode. Un examen rétrospectif des dossiers cliniques de tous les enfants traités par IS au sein du Community Dental Service of Harrow and Hillingdon NHS Trust (HHHT) sur une période de trois mois a été réalisé. Les détails personnels et l'expérience dentaire antérieure ont été enregistrés. Le résultat du traitement prévu a été établi.

Résultats. 211 dossiers ont été passés en revue par 8 cliniciens. L'âge moyen des enfants était de 7,2 ans. Les traitements prévus ont été menés à bien avec succès dans 83,9% des cas. 18,5% des enfants avaient déjà subi une anesthésie générale (GA) pour soins dentaires, et 27,5% avaient reçu une IS. 5,2% n'avaient pas d'expérience dentaire préalable. Parmi les « échecs de traitements », 50% avaient moins de 7 ans et 31,3% avaient été adressés pour GA. Il n'y avait pas de différence dans la proportion d'échecs en relation avec l'expérience de l'opérateur.

Conclusion. Cette revue montre que la sédation par inhalation de protoxyde d'azote/oxygène est une aide efficace dans la prise en charge clinique des enfants d'un service dentaire communautaire.

Zusammenfassung. The German translation for this article will appear in the next issue.

Resumen. *Objetivos.* valorar los resultados del tratamiento con sedación por inhalación de óxido nitroso/oxígeno (IS). Relacionarlo con la edad y la experiencia previa dental del niño y la experiencia del operador. Aportar información básica e identificar las necesidades de capacitación.

Método. Se hizo un examen retrospectivo de los registros de todos los niños tratados con IS en el servicio dental comunitario del Trust Harrow y Hillingdon NHS (HHHT) en un período de 3 meses. Se registraron los detalles personales y la experiencia dental previa. Se identificó el resultado del tratamiento planteado.

Resultados. Se revisaron 211 fichas de registros de 8 clínicos. La media de edad de los niños fue de 7,2 años. Los planes de tratamiento se completaron con éxito en el 83,9% de los casos. El 18,5% de los niños habían tenido previamente anestesia general (AG) para el tratamiento dental y el 27,5% había recibido IS. El 5,2% no había tenido experiencia previa dental.

De los tratamientos fallidos, el 50% tenían menos de 7 años de edad y el 31,3% fueron referidos para AG. No hubo diferencia en la proporción de fallos en relación con la experiencia del operador.

Conclusión. Esta revisión muestra que la sedación por inhalación con óxido nitroso/oxígeno es de una ayuda valiosa en el tratamiento clínico de los niños en el Servicio Dental Comunitario.

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