

# Pain relief for paediatric dental chair anaesthesia: current practice in a community dental clinic

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**Summary.** *Aim.* A review of different modes of pain relief for simple dental extractions under general anaesthesia in a community dental setting.

*Patients and methods.* Different analgesia regimens are used by different anaesthetic teams working in a single community clinic. A total of 72 patients were reviewed post-operatively in the recovery room and followed up with a telephone survey 24 h later to assess pain experienced by the patients. The efficacy of different analgesia regimens was analysed.

*Results.* The majority of patients were pain free in recovery, independent of the method of pain relief used. Local anaesthetic injections appear superior to systemic analgesia, and patients with local anaesthetic injections were more settled in recovery.

*Discussion.* Simple dental extractions cause pain and efficient administration of appropriate analgesia should be an integral part of the community dental service.

## Introduction

Dental chair anaesthesia was often described as the 'sniff and snatch' procedure where patients received a short anaesthetic, most commonly with use of inhalational anaesthetic drugs, and teeth were removed once the child was asleep. A crying child in recovery was a very common feature of those days of dental treatment. Crying in recovery was often explained by the children waking up in a strange environment, or by being concerned by the taste of blood in the mouth. Yet typically these operations were carried out without the provision of peri-operative pain relief.

Sporadic publications have centred on the provision of pain relief for dental treatment, in combination with general anaesthesia. The use of topical bupivacaine [1] has been described, as well as the use of intravenous agents, for example ketorolac

and fentanyl [2]. Diclonofac suppositories have also been used [3]. Infiltration of local anaesthetics is commonly used for oral surgery [4], but is not an established procedure in the community dental setting for simple procedures.

The reorganization of community dental anaesthesia in North Tees allowed centralization of anaesthesia sessions in a single dental surgery. Different dentists and anaesthetists work in these facilities, but all practitioners use analgesia for painful procedures in this setting. For historical reasons different teams have developed different regimens for the provision of peri-operative analgesia, resulting in the use of several different drug regimens.

The authors recently undertook a review of pain that is apparently experienced by patients in recovery and within the first 24 h post-operatively, following dental extractions, with the different analgesia regimens in use.

## Patients and methods

A total of 72 patients (31 male, 41 female) aged 2–16 years underwent simple dental extractions under

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**Table 1.** Demographic data of patients.

	Number of patients	Male/female	Mean age (years)
Local analgesia group	50	26/24	7.4
Oral/i.v. group	22	5/17	7.8
Total	72	31/41	7.5

general anaesthesia. Demographic data are summarized in Table 1. Extraction for caries was required in 67 patients, five patients had teeth extracted for orthodontic reasons, and three patients required conservation treatment in addition to extractions.

Anaesthesia was induced with i.v. propofol in 48 patients. The remaining 24 children preferred a gaseous induction, which was performed using sevoflurane. A nasal mask was the most commonly used airway technique, which was used for 53 children. A laryngeal mask was used for 16 patients, and three patients were intubated to allow conservation in addition to the required extractions. General anaesthesia was maintained by continuous administration of oxygen, nitrous oxide, and sevoflurane. Atracurium besylate or Vecuronium bromide were used as short acting muscle relaxants in patients requiring ventilation; the choice depended on the medical history of the patients.

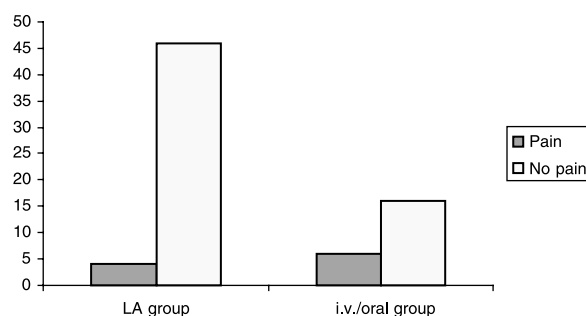
Lignocaine was administered by local infiltration in 50 children after induction of general anaesthesia. It was used at approximately half the dose that would normally be used without a general anaesthetic.

Of the 22 children who were given systemic analgesics, 17 received intravenous fentanyl, either as sole agent, or in combination with an oral paracetamol pre-medication. An oral paracetamol pre-medication was the sole form of analgesia for five patients.

Post-operative pain was assessed in the recovery area using the pain scale in routine use by anaesthetists working at the hospital: score 0 = no pain, score 1 = mild pain, score 2 = moderate pain, score 3 = severe pain, and score 4 = constant and severe pain. Assessment was made through questioning or observation.

In addition, the children's behaviour, as a more objective sign of pain or distress, was observed.

Parents were contacted by telephone 24 h later by one of the authors who had no knowledge of the analgesia regimen used, or the procedure performed. On this occasion the parents were asked to grade the pain that they felt the child had experienced at home



**Fig. 1.** Number of patients experiencing no pain/pain in recovery. The difference between the two groups did not reach statistical significance ( $P > 0.05$ , Fisher's exact test). LA = local analgesia.

according to the same scale. Parents were also asked whether further analgesics had been required.

## Results

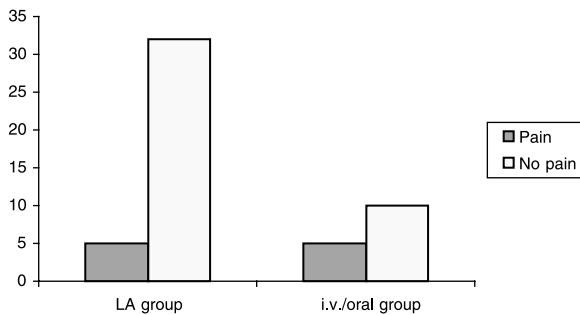
Demographic information for the 72 patients is summarized in Table 1. Patients who did and did not receive systemic analgesia were of comparable mean age.

Following simple dental extractions under general anaesthesia, the majority of patients, 62 of 72 (86.1%) were reported to be pain free in recovery. These results are given in Fig. 1. Only nine patients (12.5%) were reported to have experienced mild pain, and one patient (1.4%) experienced moderate pain during the immediate postoperative period.

Of the 50 patients who had a local analgesia infiltration, four (8%) had experienced mild pain. Of the 22 patients who received systemic analgesia, six (27%) experienced pain in recovery, five (23%) had mild pain and one (4.5%) had moderate pain. Of the six patients who had mild or moderate pain, three had received fentanyl, either as sole analgesia or in combination with oral analgesic pre-medication, and three patients had received oral analgesic pre-medication only. The difference between these two groups did not reach statistical significance ( $P > 0.05$ , Fisher's exact test).

Children experiencing pain in recovery were offered paracetamol or piroxicam by mouth.

Parents of 15 of 22 children treated with systemic analgesia, and 37 of 50 patients treated with local infiltration, were contacted at home 24 h post-operatively. Parents of the remaining 20 could not be reached. The results of the pain observations at home within 24 h after extraction are summarized in Fig 2. The difference between the children who had local analgesia (LA) and those who had systemic



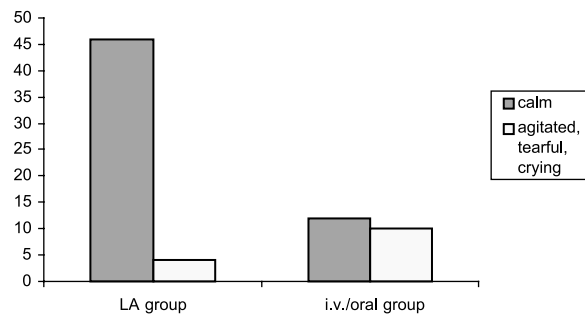
**Fig. 2.** Number of patients experiencing pain at home within 24 h of dental extraction. (Difference between the local analgesia group and the i.v./oral analgesia group was not statistically significant,  $P > 0.05$ ). LA = local analgesia.

analgesia did not reach statistical significance. In each group, five children had experienced mild pain (LA group, five of 37–13.5%; systemic group, five of 15–33%). All other patients were reported by their parents to have been pain free. Further paracetamol had been given to eight patients in the systemic analgesia group, and to 12 children in the local analgesia group. One child in the local analgesia group had also been given ibuprofen.

In terms of behaviour, it was noted that 58 of 72 patients (81%) had been settled in recovery, including 46 patients who had received local anaesthesia, and 12 patients who had received systemic analgesia (92% vs. 55%). Of these settled patients, 17 had been agitated, tearful or crying at induction. Considering each patient's behaviour in recovery, those who received local anaesthesia had appeared more settled than the patients who had received oral/i.v. analgesia. In this case, the difference between these two groups was statistically significant ( $P < 0.001$ , Fisher's exact test). These results are summarized in Fig 3.

Fourteen patients were agitated, tearful or crying in recovery. Of these children, 10 had received systemic analgesia, and four had been treated with local analgesia infiltrations. Of these 14 patients, two in each group had been calm at induction.

In total, 276 teeth were extracted, 112 teeth in the group receiving oral/intravenous analgesia (5.1 teeth per patient), and 164 teeth in patients receiving local anaesthetic (3.3 teeth per patient). In the local anaesthesia group, two patients had extractions of primary incisors, lateral incisors and canine teeth only, all other patients had molars extracted, either solely or in combination with anterior teeth. The most commonly extracted teeth were primary first



**Fig. 3.** Number of patients showing calm or unsettled behaviour in recovery. The difference between the local analgesia group and the i.v./oral analgesia group was statistically significant ( $P < 0.001$ ). LA = local analgesia.

molars ( $n = 86$ ), primary second molars ( $n = 84$ ) and permanent first molar teeth ( $n = 35$ ). The number of teeth extracted per patient varied from 1 to 10.

On questioning, all parents replied that they had been satisfied with the service provided for their children.

## Discussion

Simple dental extractions are common procedures in the community dental settings across the country. Traditionally, these procedures have been carried out without the administration of pain relief.

A recent survey has shown that administration of analgesia is considered more often now, but still cannot be taken for granted [5]. In the recent past, attention has been drawn to the fact that dental extractions may cause pain, and reports show that approximately two-thirds of patients experience pain if no analgesia is administered [6,7].

In this review, the vast majority of patients appeared to be pain free in recovery, independent of the method of pain relief used. Pain levels were registered using a simple pain scale, and no attempt was made to validate the scale or to test reproducibility, although it was in common use throughout the hospital.

Preliminary data drawn from a study in the community dental setting has suggested that good analgesia and patient satisfaction may be achieved with local anaesthetic injections in adult and paediatric patients [8], and that local anaesthetic injections may provide a better pain relief than systemic analgesia in at least some cases [9]. This review of paediatric patients would seem to confirm those findings; 92% of patients in the LA group were pain

free, as were 73% of patients in the systemic analgesia group. The difference was not significant when looking at pain scores alone. But when the patient's behaviour was taken into account, significantly more patients in the local anaesthesia group were settled post-operatively in recovery than patients who had received a systemic analgesic. Behavioural assessment has become a well-recognized method of assessing postoperative pain [10], and supports our findings of local analgesia infiltrations providing a significant advantage over i.v./oral analgesia.

In this study, the infiltration of lignocaine was used to provide pain relief during the immediate recovery period, allowing the children to wake up from the general anaesthetic without pain. This infiltration provides pain relief for about two hours postoperatively with localized numbness in the area of tooth removal.

Further analgesia at home was only required in a minority of patients. This was true, whichever type of analgesia was used at the time of surgery. It was noted, that more patients had analgesia at home than had described pain. It was concluded that some patients have used further pain medication at home in anticipation of pain, without having actually experienced it.

Pain relief is important. Most of the patients treated under general anaesthesia in community dental practice have special needs, or are young children with a limited understanding of what is happening. Even relatively simple dental extractions may cause pain for these children. Administration of effective analgesia can help to make a potentially feared but necessary procedure more acceptable and less frightening for the patients, reduce emotional distress, and avoid development of a negative attitude towards dental procedures in the future.

It was apparent that oral and intravenous administration of analgesia provides good pain relief; but local anaesthetic injections may appear to be significantly superior to this. Both methods are reliable ways to alleviate pain and are a big improvement in quality of care for community dentistry. They may also avoid the need for rectal drug administration, which, especially in the community dental setting, may not be widely accepted by parents or patients.

Peri-operative analgesia should be considered for all but the most minor procedures. Further studies are needed to confirm the results of this study in a prospective trial.

## Acknowledgements

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**Résumé.** *Objectif.* Revue des différents mode de suppression de la douleur pour de simple extractions sous anesthésie générale en établissement de soins communautaire.

*Patients et Méthodes.* Différents types d'analgésie sont utilisés par différentes équipes d'anesthésistes au sein d'une seule clinique communautaire. Un total de 72 patients ont été revues après l'intervention en salle de réveil et suivis par téléphone 24 heures plus tard pour évaluer leur expérience douloureuse. L'efficacité des différents types d'analgésie a été analysée.

*Résultats.* La majorité des patients n'a pas ressenti de douleurs après l'intervention, quelque soit le type d'analgésie utilisé. Les injections d'anesthésie locale semblent supérieures aux analgésies systémiques, et les patients ayant bénéficié d'injections d'anesthésie locale ont été plus calmes au réveil.

*Discussion.* De simples extractions dentaires sont sources de douleurs et l'administration efficace d'un analgésique approprié devrait être part intégrale du service dentaire communautaire.

**Zusammenfassung.** *Ziel.* Eine Übersicht über verschiedenen Methoden der Schmerzkontrolle für einfache Zahnextraktionen unter Vollnarkose in einer kommunalen zahnärztlichen Behandlungseinrichtung.

*Patienten und Methoden.* Verschiedenen Analgesieschemata wurden von verschiedenen Anästhesistenteams, die in einer kommunalen Zahnbehandlungseinrichtung arbeiten, angewandt. Insgesamt 72 Patienten wurden nach der Behandlung im Aufwachraum befragt, nach weiteren 24 h erfolgte eine zweite Befragung telephonisch, um das Ausmaß der Schmerzen zu ermitteln. Die Wirksamkeit der verschiedenen Methoden wurde analysiert.

*Ergebnisse.* Die Mehrzahl der Patienten war in der Aufwachphase schmerzfrei, unabhängig von der benutzten Methode. Anscheinend war die Lokalanästhesie der systemischen Analgesie überlegen, die Patienten mit örtlicher Betäubung erholten sich schneller.

*Diskussion.* Einfache Extraktionen verursachen Schmerzen, eine wirksame Schmerzkontrolle sollte

unverzichtbarer Bestandteil einer zahnärztlichen Behandlung sein.

**Resumen.** *Objetivo.* Una revisión de los diferentes métodos de alivio del dolor para las extracciones dentales sencillas bajo anestesia general en el escenario de la comunidad dental.

*Pacientes y métodos.* Diferentes equipos de anestesia que trabajan en una sola clínica comunitaria, usan distintas pautas de analgesia. Se revisaron postoperatoriamente un total de 72 pacientes en la sala de recuperación y fueron seguidos con una vigilancia por teléfono 24 horas más tarde, para valorar el dolor experimentado por los pacientes. Se analizó la eficacia de diferentes pautas de analgesia

*Resultados.* La mayoría de los pacientes estaban libres de dolor en la recuperación, independientemente del método de alivio del dolor usado. Las inyecciones de anestesia local parecen superiores a la analgesia sistémica y los pacientes con inyecciones de anestesia local se afianzaron más en la recuperación.

*Discusión.* Las extracciones dentales sencillas causan dolor y la administración eficiente de la analgesia apropiada debería ser una parte integral del servicio de la comunidad dental.

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