Topical bupivacaine for pain control following simple dental extractions

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Objective This study was carried out to examine the effectiveness of topically applied bupivacaine 0.25% with adrenaline 1:200 000, for post-operative analgesia in children undergoing dental extractions under general anaesthesia.
Design Randomised double blind study in a single centre.
Setting An outpatient dental clinic in a district general hospital, in England, in 1997.
Subjects and Methods Subjects were selected from children of age 7–15 years having six or less extractions, and randomised using the closed envelope technique.
Interventions The local anaesthetic used was bupivacaine 0.25% with adrenaline 1:200 000.
Main outcome measures Children were asked on waking from the anaesthetic whether they had pain or not. Pain was reassessed five and ten minutes post application of swabs to determine any changes in pain.
Results Forty-eight children were recruited, of these 18 had no pain post-operatively and 6 were withdrawn due to a lack of cooperation. Twelve children were randomised to each group. There were 6 boys and 6 girls in the bupivacaine group (age 7–15 years), and 4 boys and 8 girls in the saline group. Bupivacaine 0.25% with adrenaline soaked swabs resulted in a significant reduction in pain in 10 children at 10 minutes ($P = 0.01$).
Conclusion Bupivacaine 0.25% with adrenaline 1:200 000, on application to exposed sockets is a simple technique that may provide useful post-operative analgesia.

Pain following simple dental extractions in children can be a cause of distress to both the child and its parents, it can also be a cause of delayed discharge in day-surgery patients. The authors set out to examine the efficacy of applying dental rolls soaked in bupivacaine with adrenaline for analgesia following dental extractions in children under general anaesthesia in a hospital out patient setting.

Method

Following ethics committee approval, 48 children due to undergo dental extractions as hospital out-patients were recruited by obtaining written parental consent. Patients were all ASA 1 or 2 with no contra-indications to receiving local anaesthetics, who were having no more than 6 extractions, and were deemed old enough to cooperate (greater than 6 years old).

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Prior to surgery the patients were randomised, using the closed envelope technique, to receive dental rolls soaked in 7 ml of either bupivacaine 0.25% with 1:200 000 adrenaline (5 μg/ml), or 0.9% aqueous sodium chloride solution. The clinician responsible for the administration of the dental rolls, and questioning the subject regarding the pain/discomfort felt post-operatively was blind to the solution used.

Patients received a standard anaesthetic consisting of induction and maintenance using Sevoflurane in oxygen through a face mask. On waking, enquiries were made of each subject as to any pain/discomfort he or she might be experiencing. If pain or discomfort was present, the subject was asked to bite on the previously prepared dental rolls.

The pain assessment took the form of two simple questions asked at five and ten minutes after the application of the swabs:

1. Is the pain the same or nearly the same as before the swabs were applied?
2. Has the pain gone or nearly gone since the swabs were applied?

Statistics

Fishers exact test was used to compare the pain relief between the groups. Differences between the groups were taken to be significant if the probability of the null hypothesis was less than 0.05.

Results

The authors had to enrol 48 subjects to obtain the 24 required for the study. No one who was asked to participate refused. Of the 48 who enrolled initially, six were withdrawn when, despite being in pain post-operatively, they were so upset they declined to hold the swabs in their mouths. A further 18 were free of pain following their extractions (18 out of the 48 recruited, 37.5%). There was no statistically significant difference between those who did and did not experience pain in terms of age, weight or number of teeth extracted. There were no differences shown between the study group and the control group in terms of sex distribution, ages, weights or number of teeth extracted (Table 1).

At five minutes, seven patients in the study group had significantly improved pain compared to two patients in the control group ($P < 0.05$). At ten minutes, ten patients in the study group had significantly improved pain compared to three patients in the control group ($P = 0.01$) (Table 2).

Table 1 Patient data

	Bupivacaine (n = 12)		Normal saline (n = 12)	
M/F (n)	6/6		4/8	
Ages (years)	7–15	median 10.5	7–14	median 11.5
Weights (kg)	22–57	median 38.5	23–72	median 40
No. of teeth extracted	1–6	median 3	1–4	median 3

Table 2 Differing outcomes of pain experienced according to solution used to soak swabs

	Bupivacaine (n = 12)		Normal saline (n = 12)	
	Same or nearly so	Much better or gone	Same or nearly so	Much better or gone
at 5 mins	5	7*	10	2
at 10 mins	2	10†	9	3

* $P = 0.09$, † $P = 0.012$ (Two tailed P value, comparing bupivacaine to saline groups 'Much better or gone').

Discussion

While the use of local anaesthetics in dentistry is standard practice, no previous work was found that had looked at the simple method of bupivacaine and adrenaline soaked dental rolls/swabs. The nearest comparable study applied EMLA cream (a mixture of lignocaine and prilocaine) or lignocaine ointment topically to the gums in order to produce anaesthesia so that an injection of local anaesthetic solutions could occur painlessly.[1] Another study applied EMLA to the exposed pulp of carious teeth in order to produce dental anaesthesia.[2]

The safe dose of bupivacaine is 2 mg/kg, therefore the total dose of bupivacaine that the author's applied was safe in any child weighing more than 8.75 kg (those older than one year). Using this technique it is very unlikely that toxicity from bupivicaine would occur even with larger doses, since minimal absorption would occur from this site. More children derived benefit from bupivacaine at ten minutes than at five minutes, it would therefore seem logical to apply the swabs immediately after completing the extractions, to maximise benefit and afford analgesia on waking. Unfortunately, no follow up of pain following discharge took place, therefore we do not know how long the benefit from the topical anaesthetic lasted.

When deciding on the prophylactic use of simple analgesics/NSAIDS(non-steroidal anti-inflammatory drugs) it is worth noting that, in this series 37.5% of the children had no pain following up to six extractions.

Conclusion

The authors have shown in this pilot study that bupivacaine 0.25% with adrenaline 1:200 000 when applied to the exposed sockets, is a very simple technique that may rapidly and effectively relieve post-operative discomfort following simple dental extractions. In view of the results, a larger scale and more detailed investigation would be useful.

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1 Meechan J G, Donaldson D. The intra-oral use of EMLA cream in children: a clinical investigation. *ASDC J Dent Child* 1994; 61: 260-262.

2 Vickers E R, Punnia-Moorthy A. Pulpal anaesthesia from an application of a eutectic local anaesthetic. *Quintessence Int* 1993; 24: 547-551.

First Diploma in Conscious Sedation

At a recent ceremony at the University of Newcastle upon Tyne, 28 dental postgraduate students were awarded the Diploma in Conscious Sedation in Dentistry. This was the culmination of the first diploma course of its kind in the UK, organised by the Northern Region Postgraduate Institute for Medicine and Dentistry. The course was set up in response to the increasing use of conscious sedation and demand by dentists for formal training directly applicable to their own clinical practice. It consisted of 20 sessions of formal teaching, 14 sessions of hands-on clinical training held at hospitals in Newcastle, Sunderland and Middlesborough and substantial self-directed learning, with an externally-moderated final examination.

Successful students, including those from as far afield as Kent, the Midlands and Scotland, are pictured with Professor Archibald (University Pro-Vice Chancellor) and members of the Diploma Board of Studies.