

Pharmacological approach to the management of dental anxiety in children – comments from a Scandinavian point of view

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Pharmacological substances serve as a valuable help when treating children and adolescents with dental anxiety or behaviour management problems, but they can never be effective alone.

In considering the issue, there are a number of indications other than dental anxiety that should be borne in mind, and also that anxiety is not necessarily synonymous with behavioural problems. Good psychological understanding and care for child patients, effective behaviour management techniques, and an empathic attitude and atmosphere should form the basis for successful dental treatment for all child patients. There are many different substances and techniques that can be used but to achieve an optimal result for both patient and operating dentist, the indication for pre-medication should be first made clear, as this will affect the choice of substance and route of administration. The dentist needs to decide what needs to be achieved: Sedation? Amnesia? Reduced anxiety? A raised threshold for pain? Is the patient a child with dental anxiety? Or is it a child who presents with a behavioural problem? Is the presentation one of an acute need for dental treatment in a non-cooperative child? How old is the child? Is the child too young and/or immature to understand and cooperate? Is the best choice for a fearful child a light sedation that will enable him/her to remember successful cooperation? Are there cultural issues that may influence the choice of sedation?

In Scandinavia today, three main pharmacological substances are used for sedation in paediatric dentistry: diazepam, midazolam and nitrous oxide/oxygen. In Sweden, diazepam may be administered orally as syrup or tablets, and also rectally. Midazolam is available for

dental use as liquids for either oral or rectal administration, but midazolam is also available as tablets in several other countries. In Sweden, in relation to sedation for dentistry, specialists in maxillo-facial surgery only are permitted to give agents intravenously and only then after special certification. The intra-nasal route is also very seldom used as it is considered to be painful and uncomfortable by patients, and the intra-muscular route is simply not used at all in relation to dentistry. Nitrous oxide/oxygen sedation may be used, but again, only after special certification.

To ensure high quality in the use of sedation techniques, there are a series of recommendations that are followed by paediatric dentists in Sweden. All patients are first assessed and classified according to the American Society of Anesthesiologists' classification of physical status [1]. Dentists are permitted to take responsibility for treating patients belonging to Classes I and II, while decisions about use of sedation in patients in other classes are taken in consultation with a physician. The child's weight is documented if benzodiazepines are to be used, and both the child patient (from an appropriate age) and parent are always informed (usually both verbally and through written information) about the treatment, the expected effects of the drug, and on how the family should take care of the child at home afterwards. In the case of benzodiazepines, tablets are supplied by the clinic, whereas liquids for rectal or oral administration are administered at the dental clinic by the dentist or under his or her supervision. After treatment, the child is kept under observation at the clinic for at least 60 min after administration of the benzodiazepine.

There is a tradition in Sweden of using rectal administration of benzodiazepines in young children, up to the age of approximately 5 or 6. This is culturally

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accepted, and many parents use the same route for administering drugs, such as paracetamol for example, to a child at home. Rectal administration is also frequently used in patients with disabilities if they are unable to cooperate sufficiently for oral administration. Rectal administration has the advantage of fast onset and is often used with the aim of achieving sedation (and amnesia) in younger children for a single treatment that might be perceived as stressful such as extraction of a tooth. There are reports of high frequencies of amnesia when using rectal administration. In a recent PhD thesis from Sweden, Boel Jensen found that 85% of preschool children having extraction under rectal sedation reported amnesia, equally when using diazepam and midazolam [2]. However, the level of amnesia can never be predicted and should never be assumed when treatment is carried out. Even where amnesia does not occur, drowsiness and reduced attention may reduce the risk of negative learning experiences. Although amnesia and drowsiness may seem advantageous, they are not always desirable in the treatment of dental fear and anxiety. For an anxious child patient, a 'very light' sedation can help the child to learn how to cope with their feelings in facing dental treatment. In these cases, it is important that the child is fit enough to remember the treatment and that he/she managed to cooperate. Thus, the dosage needs to be very accurately determined for these patients.

Among Swedish paediatric dentists, midazolam is the most frequently used substance for rectal sedation for younger patients. With increasing age (from approximately 4 or 5 years of age) dentists tend to use more oral midazolam gradually. Tablets containing diazepam are mainly used in school children and adolescents. In these patients dosage is often split, with part of the dose being given the night before treatment, and the remainder 1–2 h before treatment.

Nitrous oxide/oxygen sedation is frequently used in children from approximately 5 years of age or as soon as the child is able to cooperate sufficiently to breathe

only through their nose and use a nasal mask. This is often the preferred choice of sedation as it is easy to administer, has high rates of success, and a well-documented safety record [3]. In Sweden, concentrations up to a maximum of 60% nitrous oxide may be used, but concentrations of 30–40% (or in some cases up to 50%) are most often administered.

Reported doses for benzodiazepines vary among Swedish dentists [4]: 0.3 (range 0.1–0.5) mg/kg body weight for rectal administration of midazolam; 0.3 (range 0.2–0.5) mg/kg body weight for oral administration of midazolam; and 0.7 mg/kg body weight for rectal administration of diazepam.

It is important to recognize that treatment under sedation with benzodiazepines should be limited to single treatments. If the patient's need for dental treatment is large and the patient is considered too young to understand or to cooperate, the method of choice should be treatment under general anaesthesia. General anaesthesia also has a special place in the treatment of patients with disabilities.

Much of today's knowledge regarding sedation in paediatric dentistry is based on the treatment of healthy children. In the future, there is a need for more studies on other special groups, for example, in the use of benzodiazepines in treating patients with neuropsychiatric disorders. It would also be of value to compare the results obtained when treating dentally anxious patients with those for patients judged to have behaviour management problems.

References

- 1 American Society of Anesthesiologists. New classification of physical status. *Anesthesiology* 1963; **24**: 11.
- 2 Jensen B. Benzodiazepine sedation in paediatric dentistry. Thesis. *Swedish Dental Journal* 2002; Suppl. 153.
- 3 Hallonsten A-L. Nitrous oxide – oxygen sedation in dentistry. Thesis. *Swedish Dental Journal* 1982; Suppl. 14.
- 4 Jensen B, Matsson L. Benzodiazepines in child dental care. A survey of its use among general practitioners and paediatric dentists in Sweden. *Swedish Dental Journal* 2001; **25**: 31–38.