

Acceptance of dental care following early extractions under rectal sedation with diazepam in preschool children

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The aim of the study was to evaluate the effect of amnesia in preschool children on their later acceptance of dental care. Forty-six 4–6-year-old children, who between 2 and 4 years previously had had primary incisors extracted because of trauma, were reexamined for dental health and acceptance of dental care. The extractions had been performed under rectal sedation with diazepam (0.7 mg/kg body weight). Information about dental treatment and degree of cooperation during the intervening period was obtained from records at the referring clinic. The parents were interviewed about their child's experience of amnesia concerning the extractions, background variables, and experiences of dental care before the follow-up examination. Amnesia concerning the extractions was reported in 85% of the children. Twenty-nine percent had on some occasion exhibited behavior management problems (BMP) during the intervening period. Lack of amnesia was significantly associated with BMP ($P < 0.002$). Children without amnesia concerning the extractions tended to accept dental care less well at the reexamination. Parents were able to predict their child's acceptance of dental care at the follow-up with a significant degree of success ($P = 0.02$). In conclusion, amnesia in preschool children concerning extractions seems to be essential to facilitate positive acceptance of future dental care. □ *Dental anxiety; dental behavior; diazepam; rectal sedation*

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Most 3-year-old children (85%–89%) accept a dental examination if properly introduced to the dental environment (1, 2). At about 29 months of age, children have usually developed the mental ability to cooperate during a dental examination (3), but children below that age are sometimes in need of treatment. According to earlier studies 17%–19% of Scandinavian 3-year-olds visit a dentist because of trauma (1, 4).

A child exposed to a dental trauma sometimes has to endure highly stress-provoking treatment. Small children are not mature enough to understand why and how the treatment is to be performed, so the risk for negative experiences and future dental fear is obvious. In such emergency situations there is a great need for sedation with an amnesic effect.

Dental fear is fairly common in children, having been reported in 7% of children 4–11 years of age (5), while behavior management problems (BMP) have been found in 8%–11% (6, 7). Both are more prevalent in younger children (8). Adults with dental fear often relate their problems to negative experiences of pain or physical restraint during childhood (9, 10).

Rectal sedation with diazepam, until recently the medicament of choice, has been found to be safe and to have a fast effect (11), almost comparable to intravenous sedation (12, 13). It also provides a high frequency of amnesia. The amnesic effect has mostly been studied in adults following intravenous administration (14, 15). In children, the frequency of amnesia concerning dental treatment has been shown to be 60%–80% after rectal

sedation (16, 17). However, even though children are adequately sedated, they might not experience amnesia, which could impair their future ability to cope with dental care. The long-term consequences of these sometimes highly emotionally trying events have not been studied.

The aim of the present study was therefore to evaluate the amnesic effect of rectal sedation with diazepam in children undergoing extractions of traumatized primary incisors and its influence on their future ability to cooperate in a dental setting.

Materials and methods

Patients

The study included all 57 children who, because of dental trauma, had had one or more primary incisors extracted at the Clinic of Specialized Pediatric Dentistry, Public Dental Service, Malmö, Sweden, during the period December 1990 to April 1993. Five specialists in pediatric dentistry had performed the treatments, during which the child was placed on the parent's lap to ensure security. All children had undergone the same standardized treatment, rectal sedation with diazepam (Apozepam[®], Dumex-Alpha, Helsingborg, Sweden; 0.7 mg/kg body weight) 10 min before the administration of topical and local anesthesia (Xylocain adrenalin 2%, Astra, Södertälje, Sweden). The mean age of the patients at the time of treatment was 2 years and 5 months (range, 15–44 months).

This retrospective study, which took place 2–4 years

after tooth extraction, included an interview with the parents, a review of the dental records from the referring clinic, and a dental visit to the Clinic of Specialized Pediatric Dentistry. Seven families had moved from the area, one family was non-Swedish-speaking and therefore excluded, and another refused to participate. Two families took part in the interview but declined the dental examination because of the child's handicap and personal problems. Thus, the patient group comprised 48 children: 23 girls and 25 boys whose parents were interviewed, and 23 girls and 23 boys who underwent a dental examination.

Interview

After receiving an introduction letter with information about the study, the parents were interviewed on the telephone by one of the authors (B. Jensen). A standardized questionnaire comprising 21 items was used to obtain information about the child's amnesia concerning the extraction, health status, and personality factors such as temperament and ability to cope in various dental and non-dental settings. The presence or absence of amnesia was assessed through parental reporting. For pre-verbal children this was based on behavioral observations—the parent's overall experience of whether the child immediately after the treatment or in connection with later dental visits had shown any signs of negative recollections of the extraction. For verbal children the parents had been told to ask the child on the following day, 'What happened at the dentist's office yesterday?' The parents were also asked how they thought the child would cooperate at the coming dental examination. The questionnaire was designed in collaboration with a social science consultant. (Interview questions are available on request from the corresponding author.) Eight of the questions had alternative answers arranged on a semantic scale, and the remaining had dichotomized answers (yes or no).

Review of dental records

Data about dental treatment, caries, fillings, and presence of BMP in the period between extraction and the follow-up were obtained from the referring clinic. Occurrence of BMP was based on dental notes and defined as disruptive behavior that delayed treatment or made treatment impossible.

Dental examination

At the follow-up the children had a mean age of 5 years and 4 months (range, 49–74 months). The visit to the dental clinic included a dental examination with mirror and explorer as well as professional tooth-cleaning and topical fluoride application. The child's overall ability to cope was assessed by the same author who performed the interview (B. Jensen), and his or her acceptance was classified according to Holst et al. (2) as positive, reluctant, or negative.

Statistical methods

For the statistical analysis the children were subgrouped according to the parental report of presence or absence of amnesia; dental notes of presence or absence of BMP at any dental visit between the tooth extraction and the follow-up examination; level of acceptance of the dental examination at the follow-up; and the parent's prediction of the child's ability to cooperate.

Background variables from the interview were amnesia, health status, and temperament. Background variables from the dental records were the presence of BMP and restorative treatment. Differences between groups were statistically evaluated using Fisher's exact test. The interview questions with alternative answers were dichotomized before the statistical analysis. The level of statistical significance was set at $P < 0.05$.

Results

Interview

Forty-one children (85%) had amnesia concerning the extraction treatment, six children had no amnesia, and one child recalled the experience as pleasant. The latter child was assigned to the non-amnesia group.

Most parents were satisfied with the treatment performed and the sedation used, except for two whose children did not experience amnesia.

In 13 cases (27%) the parents stated that their child felt afraid or somewhat anxious when meeting unfamiliar people or in new surroundings.

Review of dental records

The dental notes showed that the trauma treatment was the first contact with dental care for all of the children. Thereafter, 14 children (29%) had on some occasion exhibited BMP. Eleven children (23%) had received restorative treatment.

Dental examination

Of the children undergoing the dental examination ($n = 46$), 38 (83%) showed positive, 7 (15%) reluctant, and 1 (2%) negative acceptance of the procedures.

Analysis of data

Six of the 7 children (86%) in the non-amnesia group had records of BMP, compared with 8 of the 41 children (20%) in the amnesia group, a statistically significant difference ($P < 0.002$).

At the dental examination, children without amnesia tended to exhibit a more negative attitude than those with amnesia. Thirty-four of the 39 children (87%) with amnesia accepted the dental procedures with a positive attitude, compared with 4 of the 7 (57%) in the non-amnesia group ($P = 0.09$).

Restorative treatment in the intervening period did not have any statistically significant influence on BMP or level of acceptance at the follow-up. Of those with caries, nine children accepted the dental examination positively, one child reluctantly, and one child negatively. Four children had records of BMP and a history of dental caries, of whom two were reported with and two without amnesia.

The 13 children whose parents stated that they were afraid or somewhat anxious in new surroundings and when meeting unfamiliar people did not differ from the rest of the children concerning records of BMP or acceptance at the follow-up.

A statistically significant relation was found between the ability of the parent to predict the child's behavior at the reexamination and the child's level of acceptance ($P=0.02$). Of the 15 children whose behavior did not match the parent's prediction, the parents of all but 1 had underestimated their child's ability to cope.

Sex and health status had no significant influence on any of the variables studied.

Discussion

In earlier studies of rectal sedation with diazepam in children (16, 17), the amnesic effect was evaluated in a group of children with a broad age range in need of different types of dental treatment and who had had negative experiences of dental care. The present study was designed to test a more homogenous situation, focusing on very young children. They all received the same type of dental treatment, and they had no previous experience of dental care. Also, while in the earlier studies the amnesic effect was evaluated in a short perspective, the present study focused on the child's long-term recall and ability to cooperate in dental settings.

The frequency of amnesia, as reported by the parents, was high in the present study, 85%, which is in accordance with Fredén & Mejäre (16), who reported 80%. Although many of the children were pre-verbal, in no case did the parent hesitate to state whether amnesia existed or not. In pre-verbal children, presence or absence of amnesia was assessed by behavioral measures. If a child has traumatic memories, which always involve an emotional component, they would also show in similar situations, such as at a child welfare center or in a doctor's office. In the slightly older children, reports of amnesia were based on behavioral measures as well as the parents' questions on the following day. Changes in a child's behavior are best evaluated by the primary caretakers, and concordance has been shown between direct observations of infant behavior and parental reports (18).

Dental records of BMP were observed in 14 children, and in a majority of the cases this was confirmed by the parents. The six children without amnesia and with negative memories had all shown signs of BMP at dental visits in the intermediate period. Three of them had needed special training or nitrous oxide/oxygen sedation

to overcome their cooperation problems. This observation highlights the importance of being aware of treatment-induced dental fear and, when needed, taking appropriate measures, since desensitization at an early age has a more favorable prognosis and higher success rate (19).

At the dental examination the overall frequency of positive acceptance was 83%, which is in agreement with Holst et al. (2). Regarding children with amnesia the figure was 87%. There might still be a question: why not all children with amnesia cooperated at the dental examination. The four children with amnesia and reluctant behavior at the follow-up were all caries-free and had had no experience of dental treatment. This might explain their behavior, since it is reported that children who have had operative dental treatment adequately performed without pain tend to be more positive and cooperative than children with no experience of dental care (6, 20). The only child in this study with negative acceptance at the follow-up examination had undergone a painful dental treatment shortly before our examination. Pain in connection with dental treatment is the most obvious cause of failure to cooperate (21).

Children who are anxious in new settings and shy when meeting unfamiliar people might be expected to be less cooperative when visiting a new dentist (2). This was the case for two of the four children in the amnesia group who showed reluctant acceptance.

The present study showed a significant relation between the ability of the parents to predict their child's acceptance at the reexamination. This was also found by Holst et al. (2). Parents' ability to foretell the behavior of their child should be used more frequently, since it might help dental personnel to make accommodations that would facilitate dental treatment.

One girl, 30 months old at the time of treatment, had no amnesia but pleasant memories of the extraction. This was probably a result of the sedative effect, which modifies the child's reactions and facilitates the treatment. For an overwhelming majority of children at these ages, amnesia is of utmost importance to assure good cooperation in future dental care.

In conclusion, the present study showed a high frequency of amnesia in preschool children after rectal sedation with diazepam for extractions. In addition, the amnesic effect proved beneficial in helping to avoid dental fear at later dental visits. Rectal sedation, with a fast-acting and amnesia-inducing benzodiazepine agent, is therefore recommended when extractions or similar treatments are to be performed in very young children.

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