

Premedication in Pedodontics Attitudes and Agents

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Abstract

The goals of premedication in children's dentistry are to allay excessive apprehension and to prevent resistance to treatment efforts. With judicious use, premedicating agents are a valuable and necessary adjunct for the pedodontist. When integrated with proper psychological approaches, premedication may enable the anxious child to accept his first dental experiences without undue emotional turmoil or it may often allow outpatient treatment of very young "precooperative" children where the only alternative might be hospitalization and general anesthesia. Prudent employment of drugs for behavior management is dependent on the training, experience, and judgement of the operator. A regimen of premedicant drugs and dosages is presented which may serve as base line guidance for more successful management of the difficult child patient.

Literature Review

Premedication, Pros and Cons

Jones¹ places dentists into one of three categories with respect to the views they hold on premedication:

1. Those who use premedication rarely and only in exceptional cases.
2. Those who favor routine use in all patients.
3. Those who find premedication valuable in behavior problems.

Two recent surveys of pedodontists have indicated that approximately 85% use behavior modifying drugs with some frequency, and that about 15% never do.^{2,3} In both studies, questionnaire design did not exclude the possible use of nitrous oxide-oxygen by those who reported they never use drugs. It is not unlikely that some dentists in this category have found nitrous oxide an effective substitute for drug premedication.

Garfin,⁴ Olsen,⁵ and MacGregor⁶ have presented opinions which suggest there are few occasions when

a dentist should find it necessary to resort to premedicating children to obtain their cooperation. Garfin feels that the routine use of sedatives and tranquilizers may reflect a "decreased interest in the care and treatment of the complete child," and Olsen proposes that dentists examine their motives to see if they employ premedication as a "crutch." Both of these authors emphasize that when faced with a potential management problem, proper psychological approaches by the dentist will obviate the need for drugs in most instances. MacGregor believes the dentist who resorts to premedication or general anesthesia may actually be treating his own fears and admitting his inability to manage children.

In a similar vein, Chambers,⁷ a psychologist, decries dentists' use of premedication in children because it eliminates the possibility of the child's learning to manage his anxiety. Instead, the child is introduced to an unhealthy method of coping with a difficult situation in much the same manner that a drug addict or alcoholic learns to react. He also feels physical restraint is preferred to premedication because it has potentially less damaging consequences to the child. However, Fisher,⁸ another psychologist, regards any use of force by the dentist as an approach which is always contraindicated.

There are a number of authors who are proponents of routine premedication for children. Stewart⁹ feels this approach is justified and necessary because "In children experiencing perhaps their first dental visit, apprehension may be acute and damaging." He also states that emotional stress on the operator will be reduced.

Kracke¹⁰ advocates the routine use of heavy combination premedication in order that a child's total dental treatment may be accomplished in one visit. He believes that this practice avoids the multiple emotional upsets and pejorative behavior which can result from a series of appointments.

Corbett¹¹ has pointed out that under the best of conditions, dentistry is not inherently pleasant for the patient and that it is incumbent upon the practitioner to use all the aids at his disposal, including premedication, to allay the physical and emotional discomfort of the patient. He believes that the advantages of premedication should not be reserved solely for the handicapped or recalcitrant child, but should be applied to ease the first dental experiences of the normal child as well.

Lampshire¹² classifies the behavior of child patients in a spectrum from tense cooperative to hyperemotive and maintains that premedication can be of benefit to all. Dudley¹³ concurs, implying that overt resistance by the child to treatment is not the only indication for premedication. He reasons that the outwardly cooperative but emotionally anxious child who leaves the appointment wet with perspiration deserves equal consideration. Shapiro¹⁴ has recognized this type of child, saying "The absence of crying or opposition mean little . . . there are many children who react to threatening situations by becoming mute and passive," and further that "this type of child may undergo a severe neurotic storm a day or two later."

In addition to those proponents of premedication already mentioned, several others also have defended their rationale by warning of the adverse psychological consequences a dental experience might hold for the emotionally labile child. Lang,¹⁵ Album,¹⁶ Ruble,¹⁷ and Kopel¹⁸ support the concept that a child may suffer "psychic trauma" with lasting consequences as a result of anxiety about dental treatment. Lewis¹⁹ assumes no position on the value of premedication but believes that subjective fears of dental procedures may arouse castration anxiety in boys or be experienced as a form of sexual assault in girls. Croxten,²⁰ however, refutes the idea that the dental experience has the potential of being a psychologically traumatic experience for the child and points out that this essentially Freudian concept is neither substantiated by research nor widely supported by psychologists. Edelston²¹ also flatly denies that serious or long lasting psychological effects can arise from an unfavorable dental experience, even in a fundamentally anxious or insecure child.

McDermott,²² a psychiatrist, states that for the young child, the dental appointment "has far reaching implications for personality growth." He abjures the experience "which has been made as non-threatening and 'painless' as possible, an emotionally sterile experience which does not harm, but neither does it promote personality development." Thus, he views dentistry for the child as providing an opportunity for emotional maturation. Others have used this concept as an argument against use of drug premedication or

nitrous oxide sedation, the reasoning being that the child must be perceptually aware to fully benefit from the learning potential of the situation.^{7,23} Hawes²⁴ disagrees with this concept and comments that it is doubtful whether an apprehensive child who should have had premedication learns anything of value while treatment is being performed.

Levitas²⁵ and Chambers⁷ have implied that premedication is at best a temporary solution to anxiety—that it only serves to postpone the inevitable confrontation the patient will have with his fears about dentistry when premedication is stopped. But Lampshire^{26,27} has found it unusual to have to continue premedication for more than three or four successive appointments and notes that the dosage may be reduced with each visit. Therefore, he considers premedication as an aid in establishing confidence and security in a fearful patient after which it is no longer needed. Album, Davies, and Gelmon,²⁸ and Chambiras²⁹ also characterize premedication as a temporary adjunct and not an indefinite substitute for proper psychological adjustment. They feel it can be used to enhance and reinforce the dentist's initial attempts at rapport with a difficult patient and that the dentist who expends the effort to become skillful at premedication is less likely to avoid treatment of children.

Premedicating Agents

Most authors seem to agree that inappropriate behavior on the part of the child patient is usually the overt manifestation of an anxiety state. Depending on the degree of anxiety and the child's ability to cope with it, this behavior may range in a spectrum from reluctant cooperation to violent physical resistance. Successful premedication aims at controlling or diminishing anxiety, thereby effecting behavior which will facilitate treatment procedures.¹⁷ That premedication is as much an art as a science is reflected by the many different drugs or combinations of drugs which have been proposed by various authors. In general though, most commonly used agents may be grouped within the broad pharmaceutical categories of hypnotics, anti-anxiety agents, and narcotics.

The hypnotic class of drugs, when used in appropriate dosages, produces sedative effects through a depressant action on the sensory cortex. For example, chloral hydrate and the short acting barbiturates, secobarbital and pentobarbital are employed quite often for premedication in dentistry. Harris³⁰ believes the barbiturates in particular are valuable for this purpose noting that they sedate quickly with a high frequency of success and a very low frequency of undesirable effects. Anderson³¹ has found chloral hydrate to be an effective and safe premedicant when used in larger dosages. Robbins³² reports success us-

ing it either alone or in combination with promethazine. He mentions that chloral hydrate has acquired an undeservedly bad reputation from its use as a component of "knockout drops" and also from erroneous reports that it was a circulatory depressant. His clinical study involved children whose ages ranged from 22 months to six years. The children in the experimental groups received either 900 mg of chloral hydrate alone or 450 mg of chloral hydrate and 25 mg of promethazine.

Dudley¹³ feels pentobarbital offers many advantages as a premedicant for children but adds that too often dentists invite failure by prescribing an insufficient dosage. For an oral dose, it is suggested that 1.5 to 2.0 mg/lb be administered one hour before the appointment. In the case of an extremely excitable child, the usual 2.0 mg/lb limit may be safely increased since there is an extremely wide margin of safety with pentobarbital. Dudley believes the paradoxical excitatory effect seen infrequently with barbiturates is of little consequence and not a valid excuse to avoid using these drugs. When this untoward reaction does occur, it usually happens shortly after administration and gives way to normal sedative action by appointment time.

The anti-anxiety drugs seem to hold promise as effective psychotherapeutic agents in dentistry, but their usefulness has not been evaluated as extensively as the hypnotics and narcotics. Most are relatively new drugs which are said to produce "psychic sedation" or "quiescence," but their pharmacodynamics are still obscure. Of the many agents in this category, two have emerged as popular choices for premedication purposes. They are hydroxyzine as either the hydrochloride (Atarax), or pamoic salt suspension (Vistaril), and diazepam (Valium).

Stewart⁹ investigated the effects of hydroxyzine clinically and felt that it reduced preoperative anxiety by producing a state of subdued emotional responses without the loss of mental alertness. He believed it to be most effective when used in conjunction with nitrous oxide-oxygen sedation. As initial dosages, he suggested 10 mg for children under four and 20 mg for those four and older, to be given 45 minutes prior to the appointment. No controls were used in evaluating the effectiveness of this regimen. A 97% success rate in management is claimed but judgement criteria were not given. Hawes²⁴ has commented that many dentists who use no premedication might well claim a similar success rate.

Diazepam (Valium) seems to offer promise in the pharmacotherapeutic approach to behavior management. The action of diazepam affects the limbic system, altering the experience and transmission of emotions. This results in the reduction of tension and pro-

duction of a certain amount of amnesia.³³ In accomplishing this sedation, diazepam has little effect on blood pressure and respiration.³⁴

Promethazine, although not classified as an anti-anxiety drug, has been characterized by Sadove and Frye³⁵ as producing a state of quiescence with little or no sign of respiratory or cardiovascular depression. Jones¹ has noted that it is remarkably free of serious side effects, and that in addition to its value in controlling apprehension, it is also useful for its anti-inflammatory and anti-histaminic properties. McDonald³⁶ indicates that promethazine alone is useful for calming anxious patients but not particularly effective in the defiant child. Dudley¹³ and Greenwald³⁷ emphasize that for maximum effectiveness, tranquilizing drugs should be taken for at least one or two days prior to a dental appointment.

Several investigators have reported on the efficacy of combining promethazine with other drugs. Kopel¹⁸ has found that children may "break through" the quiescence produced by promethazine when pain is experienced and for this reason he administers meperidine for its analgesic effect. Promethazine is given the night before and one hour before the appointment in doses ranging from 12.5 to 25 mg depending on the child's age. Meperidine is given also, one hour before the appointment, in age-determined doses from 12.5 to 50 mg.

The narcotic analgesic, morphine, has been employed in dentistry for premedicating purposes, but recently the newer synthetic narcotics seem to offer advantages which make them better choices.¹⁷ Meperidine (Demerol) and alphaprodine (Nisentil) have been mentioned most often as useful and effective narcotics for premedication. Their value in behavior control lies not so much in their analgesic properties as in the production of a euphoric state in the patient. It is for this reason that the non-narcotic analgesics such as propoxyphene and ethopheptazine citrate have little or no application in behavior management problems.¹³ In addition to euphoric and analgesic properties, the synthetic narcotics also possess some sedative properties and tend to potentiate the action of sedatives taken concurrently.²⁸ An antisialogogue effect has also been reported as a desirable side effect of meperidine.²⁷

Corbett¹¹ has proposed alphaprodine as a premedicant for children. He administers 6 mg of the drug and 1.25 mg of promethazine via a submucosal injection. The promethazine in addition to potentiating the rather small dose of alphaprodine, exerts an antiemetic action to counteract the moderate frequency of nausea and vomiting brought about by the narcotic. A major disadvantage of alphaprodine is respiratory depression⁴⁰ and although there are effec-

tive antagonists available to counteract it, this serious side effect makes it unattractive to many dentists. A synergistic depressant effect on respiration occurs when alphaprodine is combined with barbiturates and for this reason combinations of these drugs are contraindicated.⁴¹

Meperidine, although possessing less potent analgesic and euphoric properties than alphaprodine,⁴² is much less likely to produce respiratory depression or emesis.⁴³ Aduss, Bane and Lang⁴⁴ stated that it was the most commonly used premedicative analgesic at the time of their writing and a recent survey of pedodontists confirmed its continued popularity by a wide margin over the next most frequently used analgesic, alphaprodine.²

Nitrous Oxide-Oxygen Sedation

Within the past several years, it has become evident that many dentists have found nitrous oxide-oxygen sedation to be an effective agent in the management of the child patient. Wright and McAulay² reported that 44% of pedodontists in their survey were using nitrous oxide in their practices and an additional 12% had plans to use it in the near future. Forty-seven percent of those using it at the time of the survey claimed they found applications for it in at least half of their patients. For 7% of those polled, nitrous oxide was the sole agent used for out-patient child behavior management.

Sorenson and Roth⁴⁵ have summarized the advantages nitrous oxide has over premedication with other pharmaceutical agents. Rapidity of onset, accurate quantitative control, and minimal recovery time are mentioned. Also, inhalation administration is more often acceptable to the child and parent than oral, parenteral, or rectal methods of sedation. Another major reason for nitrous oxide's popularity with pedodontists undoubtedly is the relative safety of this agent. Langa,⁴⁶ a leading advocate of inhalation analgesia, has pointed out the absence of serious untoward effects of nitrous oxide when it is used in appropriate analgesic concentration.

A special application of nitrous oxide-oxygen is suggested by Moller⁴⁷ in the management of certain handicapped children. In addition to the sedating and analgesic effects, nitrous oxide is able to decrease the muscular spasticity and uncoordinated movements of the cerebral palsied child, and thus make outpatient dental care possible in many instances.

Selden⁴⁸ has commented that nitrous oxide sedation is a valuable adjunct in treating most children but that it is not always an equivalent substitute for other forms of premedication. Some degree of cooperation is required initially from the child for it to be effective and success is rare if any force or coercion is em-

ployed by the dentist. Stewart⁹ has claimed routine premedication with hydroxyzine will result in a greater percentage of children who will willingly accept the nitrous oxide nosepiece. The possible advantages of combining nitrous oxide-oxygen sedation with other forms of premedication have not been adequately evaluated.

Discussion

General Considerations

The province of the dentist is concern for the oral health of his patients. He has the responsibility of providing care in a safe, sympathetic and effective manner. Few people can accept dental treatment without at least a mild degree of anxiety and this is particularly true of children. In our profession, we have admitted universally the value of local anesthesia for obtunding pain. But we have shown some reticents a behavior problem in dental treatment visits accept dental treatment. The judicious use of premedicating drugs cannot make them substitutes for kindness, patience and understanding on the part of the dentist. Rather, their use indicates genuine concern for the well-being of the patient.

Perhaps the psychological implications of the child's dental treatment with or without premedication have been at best over-emphasized and misinterpreted. It has never been demonstrated convincingly that brief, infrequent treatment visits will have profound and lasting effects on the personality of a child in either a positive or negative sense. We should appreciate also that the extreme reactions to the dental experience evidenced by some children may be due to influences quite beyond our abilities to manage without premedication or without compromising the thoroughness or quality of treatment. The child who presents a behavior problem in dental treatment visits may display similar reactions in other stress situations, and well-intentioned attempts by the dentist using purely psychological approaches frequently will be unrewarded.

Some opponents of premedication seem to regard anxiety and discomfort as part of the human condition—admittedly unpleasant but inevitable experiences which are to be borne stoically and not mitigated by artificial means. Others argue that perception dulling sedatives deprive children of an opportunity for emotional maturation, because stress, a supposed prerequisite to character development, is diminished. The clinician might well be confused by the various claims of authors, notably those outside the dental profession, who credit him with the potential of effecting psychic trauma or personality

growth or "an emotionally sterile experience" during treatment of young patients.

The child in need of dental treatment presents a challenge to successful management for the practitioner. The apprehensive adult is able to deal with his fears by rationalization or by frankly discussing his anxieties with the dentist who may suggest premedication or general anesthesia. In pediatric dentistry, the onus of deciding whether or not to employ premedication or to resort to general anesthesia rests almost entirely with the dentist who will act on the basis of his training, judgement, and experience. The dentist who uses premedication is not necessarily "taking the easy way out." After the essential get-acquainted appointment, he must attempt accurately to predict a child's reaction to future definitive dental procedures and if, in his judgement, premedication is in order, he is faced with the responsibility of choosing proper drugs and dosages. The successful use of premedicating agents requires consideration and skill and is by no means a facile, automatic method of behavior management. Properly used, premedicant drugs always must be integrated with other accepted management techniques.

Premedication Guidelines

The following tabular guidelines to premedicant usage have been adopted by the faculty of the Pediatric Dentistry Department, The University of Texas Health Science Center at San Antonio. The tables deal with average appropriate dosages of specific drugs, used alone or in combination. It is recognized that many different agents and combinations not mentioned here, have been proposed as effective premedicants; however, selection has been consciously limited so that experience and familiarity may be gained with a few established and representative examples.

TABLE 1. Promethazine Hcl (Phenergan)

Administration: Oral

Usual Indication: 1) mild to moderate apprehension
2) may be combined with nitrous oxide for extreme apprehension

Weight (lbs)	Dose (mg)
25-45	25-37.5
45-85	25-50
85+	50

TABLE 2. Hydroxyzine (Hcl or Pamoate)

Administration: Oral

Usual Indication: 1) mild to moderate apprehension
2) may be combined with nitrous oxide for extreme apprehension

Weight (lbs)	Dose (mg)
25-45	25-50
45-85	50-75
85+	50-100

TABLE 3. Diazepam (Valium)

Administration: Oral

Usual Indication: extreme apprehension

Weight (lbs)	Dose (mg)*
25-45	2-3 mg x 3
45-85	2-5 mg x 3
85+	2-10 mg x 3

*For morning appointment: Drug should be given after dinner, at bedtime, and 1 hour before dental appointment.

For afternoon appointment: Drug should be given at bedtime, upon arising, and 1 hour before dental appointment.

TABLE 4. Chloral Hydrate (NOCTEC)

Administration: oral

Usual indication: Young "pre-cooperative" (3 years or under)

Weight (lbs)	Dose (mg)
25-45	750-1250
45-85	1000-1500
85+	1250

TABLE 5. Sodium Pentobarbital (Nembutal)

Administration: I.M.

Usual Indication: Young "pre-cooperative" (3 years or under)

Weight (lbs)	Dose (mg)
25-45	70-120
45-85	100-150
85+	150

TABLE 6. Meperidine Hcl (Demerol) and Promethazine Hcl (Phenergan)

Administration: * Meperidine Hcl - Oral or I.M.
Promethazine Hcl - Oral
Usual Indication: Hyperkinetic or recalcitrant

Weight (lbs)	Meperidine	Promethazine
25-30	25	12.5
30-35	37.5	12.5-18.75
35-40	25-37.5	12.5-18.75
40-45	50	25-31.25
45-55	50-62.5	25-31.25
55-65	50-62.5	25-37.5
85+	50-75	25-37.5

*Parental preparations may be combined for injections, but oral routes using combined elixir forms are generally preferable. For oral use: Equal parts of meperidine elixir (50mg/5cc) and promethazine (fortis) elixir (25 mg/5 cc). One teaspoon (5cc) will give 25 mg meperidine and 12.5 mg promethazine. Two teaspoons (10cc) will give 50 mg meperidine and 25 mg of Promethazine. A reversal agent (e.g., Narcan) should be readily available in case of emergency.

TABLE 7. Alphaprodine Hcl (Nisentil) and Promethazine Hcl (Phenergan)

Administration: * Alphaprodine Hcl - Submucosal
Promethazine Hcl - Oral
Usual Indication: Hyperkinetic or recalcitrant

Weight (lbs)	Alphaprodine (mg)	Promethazine (mg)
25-45	6-10	25
45-85	9-16	25-50

*Promethazine is given orally—30-45 minutes before submucosal administration of alphaprodine (Nisentil). A reversal agent (e.g., Narcan) should be readily available in case of emergency.

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