

Attitudes of Contemporary Parents Toward Behavior Management Techniques Used in Pediatric Dentistry

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Abstract

Purpose: The objective of this study was to examine parental attitudes toward behavior management techniques currently used in pediatric dentistry.

Methods: Fifty-five parents viewed videotaped scenes of 8 behavior management techniques being used during actual pediatric dental treatment. The 8 techniques shown were: (1) tell-show-do; (2) nitrous oxide sedation; (3) passive restraint; (4) voice control; (5) hand-over-mouth; (6) oral premedication (sedation); (7) active restraint; and (8) general anesthesia. Parents rated their acceptance of each technique using a visual analogue scale (VAS).

Results: Forty-six parents completed survey forms for analysis. Tell-show-do was rated as the most acceptable technique, followed (in order of decreasing acceptance) by: (1) nitrous oxide sedation; (2) general anesthesia; (3) active restraint; (4) oral premedication; (5) voice control; (6) passive restraint; and (7) hand-over-mouth. The following groups emerged with statistically similar means: (1) tell-show-do and nitrous oxide sedation; (2) nitrous oxide sedation, general anesthesia, and active restraint; and (3) general anesthesia, active restraint, oral premedication, and voice control. Hand-over-mouth and passive restraint were rated as the least acceptable techniques, and the ratings for both techniques were significantly different from all other techniques and from each other. Overall, hand-over-mouth was the least acceptable technique. Acceptance of each behavior management technique was not related to parental age, gender, education level, or social status.

Conclusions: The mean parental acceptance rating was in the acceptable range for all behavior management techniques examined in this study except for hand-over-mouth. General anesthesia was ranked as the third most acceptable technique. This high level of acceptance of general anesthesia compared to earlier studies may suggest that parental acceptance of this technique is increasing. (*Pediatr Dent* 2005;27:107-113)

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Managing uncooperative children is an important part of any pediatric dentistry practice. To accomplish treatment successfully, dentists use a variety of techniques to manage the behavior of children. Two objectives of behavior management research are to:

1. gain an understanding of parental attitudes toward behavior management techniques;

2. determine which factors might influence parents' beliefs regarding behavior management techniques.

Greater knowledge in this area could lead to better dentist-parent communication, better parent education, and, ultimately, better patient care.

Significant differences in parental acceptance of different behavior management techniques were first demonstrated by Murphy et al. That study found that parents were most accepting of tell-show-do and least accepting of the Papoose Board (Olympic Medical Group, Seattle, Wash) and general anesthesia.¹ In a companion study, Fields et al examined parental acceptance of behavior management techniques when used to accomplish different types of dental treatment. Parents in that study indicated greater

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acceptance for more aggressive behavior management when more serious dental treatment was required.² Lawrence et al found that parents rated behavior management techniques as more acceptable if the technique's purpose was more extensively explained to them.³ Although these studies used somewhat different methods, they found a similar hierarchy of approval for the techniques.

Other variables also have been investigated relative to behavior management techniques and parental acceptance. Havelka et al, whose study examined the effect of parental social status on acceptance of behavior management techniques, found few differences in acceptability ratings between parents of different social status.⁴ The possibility that parental acceptance of behavior management techniques might be influenced by a group presentation method was studied by Wilson et al. They found that, although parents tended to rate techniques as less acceptable when they were in a group rather than alone, the differences in acceptability ratings were not significant.⁵ Brandes et al found that parents of disabled children and parents of nondisabled children did not vary significantly in their acceptance of most behavior management techniques.⁶ Scott and García-Godoy found that Hispanic parents were most accepting of tell-show-do and least accepting of hand-over-mouth and the Papoose Board.⁷

While several studies have investigated parental acceptance of behavior management techniques in hypothetical situations,¹⁻⁷ a few have examined parental attitudes toward a technique after that technique was actually used with the subject's child. ElBadrawy and Riekman reported a high level of acceptance for intramuscular conscious sedation among parents whose children had undergone sedation for dental treatment.⁸ A survey by Frankel found a high level of acceptance for the Papoose Board among mothers of children who underwent dental treatment in the Papoose Board.⁹ Peretz and Zadik found that most parents whose children had been treated using voice control, restraint, the Papoose Board, or sedation tended to find each technique at least somewhat acceptable.¹⁰

Prevailing parental attitudes toward behavior management techniques are not necessarily static—they are subject to change over time, as society changes. It is important, therefore, to regularly revisit this issue and to update our understanding of current parental attitudes. The purpose of this study was to examine attitudes toward behavior management techniques among contemporary parents.

Methods

A videotape presentation and questionnaire were used to examine parents' attitudes toward certain behavior management techniques. The videotape was the same used by Lawrence et al.³ Attitudes toward the following behavior management techniques were examined: (1) tell-show-do; (2) nitrous oxide sedation; (3) passive restraint (medical

immobilization with the Papoose Board); (4) voice control; (5) hand-over-mouth; (6) oral premedication (sedation); (7) active restraint (physical restraint by dental personnel); and (8) general anesthesia. Acceptance was evaluated using a visual analogue scale (a continuous scale ranging from 0 to 100).

The procedures, potential risks, and benefits of participating in this study were fully explained to the subjects involved, and their informed consent was acquired prior to the investigation. This study was approved by the Institutional Review Board of Columbus Children's Hospital.

Each of the behavior management techniques used in this study has been approved by the American Academy of Pediatric Dentistry (AAPD). The AAPD established behavior management guidelines, which describe the objectives, indications, and contraindications for the use of each technique.¹¹ The guidelines broadly divide techniques into 2 categories: (1) basic behavior management; and (2) advanced behavior management.

Basic behavior management techniques examined in the present study included: (1) tell-show-do; (2) nitrous oxide sedation; and (3) voice control. The other techniques examined in this study (passive restraint, hand-over-mouth, oral premedication, active restraint, and general anesthesia) were considered advanced behavior management.¹¹

Fifty-five subjects were recruited from parents bringing children for routine outpatient dental care at the Columbus Children's Hospital dental clinic. Three subjects were recruited from parents bringing children for dental care at a private pediatric dentistry office in the metropolitan Columbus, Ohio area. Parents of children presenting for emergency treatment, sedation, or general anesthesia were excluded, as were parents of patients treated by the authors.

Parents interested in participating were brought to a private room equipped with chairs and a 9-inch TV/VCR unit (Funai Corp, Teterboro, NJ). The purpose of the study was explained, and informed consent was obtained from those parents who chose to participate. The author read an identical prepared script to each parent or group of parents. The script reviewed the purpose of the study and gave instructions for completion of the parent survey form.

After these instructions were given, each parent was allowed time to respond to several demographic questions on the survey form. The form asked parents for their age, gender, education level, and occupation. The education and occupation data were used to calculate the Hollingshead score of social status.¹² Once each parent completed the demographic survey, the author started the videotape and left the room.

The videotape used in this study was produced by Lawrence et al and was used in a number of previous studies.^{3-5,7} These videotape examples were previously

validated and are consistent with previous and current AAPD guidelines.¹¹ The videotape showed 8 behavior management techniques being used with actual patients in a dental clinic setting.

The techniques were demonstrated in the following order: (1) tell-show-do; (2) nitrous oxide sedation; (3) passive restraint; (4) voice control; (5) hand-over-mouth; (6) oral premedication (sedation); (7) active restraint; and (8) general anesthesia. This order was consistent with previous research and was originally derived by randomization.³ The same dentist explained the purpose and implementation of each technique prior to demonstrating them. Next, the name of each technique was shown against a black background while the dentist asked "How acceptable is this technique?"

The 8 behavior management techniques were listed on each parent's survey form. Below the name of each technique was printed a 100-mm horizontal visual analogue scale (VAS) response line. At the left end of the line appeared the words "completely acceptable"; at the right end of the line appeared the words "completely unacceptable." The subjects were instructed to rate the acceptability of each technique, after it was demonstrated, using the VAS response line. Each parent placed a vertical mark on the appropriate horizontal line at a point corresponding to their personal rating of each technique, on a scale from "completely acceptable" to "completely unacceptable." This process continued as all 8 techniques were shown and evaluated by the subjects. At the videotape presentation's conclusion, the author returned to the room, collected the survey forms, and dismissed the subjects.

The acceptability rating by each technique's subject was determined by measuring the distance on each VAS line from the left anchor mark to the mark made by the subject. All measurements were made to the nearest millimeter by the author. Some subjects circled the left or right anchor point on the VAS line. In these cases, the response was counted as 0 mm or 100 mm, respectively. Similarly, in cases where subjects circled either the "completely acceptable" or "completely unacceptable" label at the end of the VAS line, the response was counted as 0 mm or 100 mm, respectively. A subsample of 15 VAS responses was measured twice to establish measurement error.

Previous studies using the VAS to examine parental acceptance of behavior management techniques have evaluated the reliability of the subjects' VAS responses to a technique over a period of time. Both Murphy et al and Lawrence et al found that the VAS scale was reliable in measuring parental acceptance.^{1,3}

Reliability was established by calculating the intraclass correlation coefficient for the replicate measures.

VAS measurements were analyzed using a factorial analysis of variance (ANOVA) with repeated measures. The independent variables consisted of age, gender, education level, social status, and behavior management

technique. A square-root transformation of the VAS ratings was utilized to normalize the data. Factors not significant in the fully saturated model were dropped, and a reduced model was used for the final analysis. Post hoc testing was done using the Tukey-Kramer method.

Results

Of the 55 parents who agreed to participate in the study, 46 returned completed survey forms answering all acceptability questions. The results reported are from those 46 parents. Thirty-eight parents were female and 8 were male. The parents ranged in age from 22 to 53 years, with a mean age of 34.7 years. When asked to report the highest level of education they had completed, 5 parents reported earning a bachelor's degree, 22 indicated completing at least 1 year of college, 16 reported graduating high school, 2 revealed completing the 10th or 11th grade, and 1 indicated completing less than the sixth grade.

Each parent's social status was calculated using the Hollingshead index, which factors education, occupation, sex, and marital status.¹² This index uses cumulative scores ranging from 8 to 66 to assign subjects to 1 of 5 social strata. The mean social status score of parents in this study was 35, with a standard deviation of 10.73. Of the parents in this study, 9% were from the highest (fifth) social stratum, while 26% were from the fourth stratum, 39% from the third (middle), 19% from the second, and 7% from the first or lowest social stratum.

Analysis of reliability of the measurements of the distance on the VAS line between the left anchor point and the subject's mark resulted in an intraclass correlation coefficient of 1 (95% confidence interval=1-1).

The fully saturated statistical model revealed significant effects only for behavior management technique ($P<.0001$) and not for any of the other factors or interactions ($P>.10$). Each behavior management technique's level of acceptance was not related to parental age, gender, education level, or social status.

Tell-show-do was rated as the most acceptable technique, followed (in order of decreasing acceptance) by nitrous oxide sedation, general anesthesia, active restraint, oral premedication, voice control, passive restraint, and hand-over-mouth. There were significant differences in the mean VAS rating between several of the techniques. The results are shown in Table 1 and graphically in Figure 1. Acceptability ratings for passive restraint and hand-over-mouth were each significantly higher (less acceptable) than all other techniques.

The following groupings of mean VAS ratings were not significantly different: (1) tell-show-do and nitrous oxide sedation; (2) nitrous oxide sedation, general anesthesia, and active restraint; and (3) general anesthesia, active restraint, oral premedication, and voice control. All techniques except hand-over-mouth were judged, on average, to be in the more acceptable range (<50).

Table 1. Mean VAS Rating by Technique

Technique	Mean (mm)(\pm SD)	Minimum	Maximum
Tell-show-do (TSD)	7.8 \pm 11.2	0	51
Nitrous oxide sedation (N2O)	13.2 \pm 14.7	0	62
General anesthesia (GA)	21.7 \pm 23.2	0	100
Active restraint (AR)	24 \pm 21.2	0	82
Oral premedication (OP)	26.9 \pm 25	0	97
Voice control (VC)	27.7 \pm 21.4	1	87
Passive restraint (PR)	49.7 \pm 32.1	1	99
Hand-over-mouth (HOM)	77.2 \pm 24.3	17	100

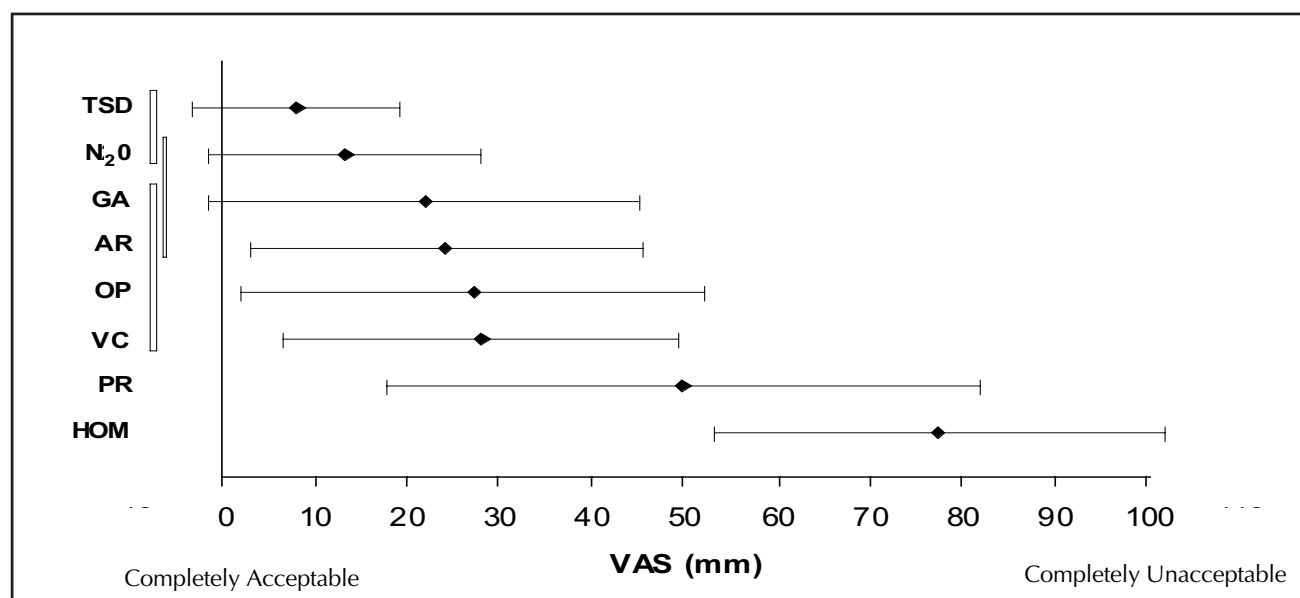


Figure 1. Mean VAS (\pm SD) rating by technique.*

*Vertical lines (I) indicate mean values that were not significantly different between techniques (ANOVA and Tukey test).

Please note abbreviations are also used in Table 1 above.

Discussion

Several previous studies have used the VAS to measure parental acceptance of behavior management techniques. These studies have considered a VAS rating of less than 50 mm (based on a 100-mm line) to indicate that a technique is acceptable to parents.^{3,4,6,7} This break-point is entirely arbitrary, but using this criterion, all techniques evaluated in this study had mean VAS ratings in the more acceptable range, except for hand-over-mouth. The mean VAS rating for passive restraint, 49.7 mm, was close to being in the more unacceptable range.

The mean VAS ratings for all of the techniques were associated with large standard deviations. This indicates that there is considerable variability in parental attitudes toward all these techniques. Nevertheless, when the mean VAS rating for each technique is examined, an apparent hierarchy of parental acceptance emerges. Table 2 lists the techniques in order of their acceptability. The Table also

lists the rankings from the Murphy et al and Lawrence et al studies.^{1,3} The relative acceptability of some techniques has changed, while the acceptability of others seems more constant over time. These 2 studies and the current study encompass 2 decades of investigation.

Tell-show-do and nitrous oxide sedation were the techniques that parents found most acceptable in the current study. These 2 techniques have tended to be among the most highly accepted techniques in previous studies.^{1,3,4,7} This finding is not surprising, as these are among the safest and least aggressive behavior management techniques. The acceptability of these techniques appears to be relatively stable over time.

The mean acceptability ratings for general anesthesia, active restraint, oral premedication, and voice control were all statistically similar and in the more acceptable range in this study. The relative acceptability ratings of active restraint, labeled as physical restraint in Murphy et al's study,

Table 2. Techniques Ranked by Acceptability (Greatest to Least) in 3 Similar Studies*

Murphy et al ¹ 1984	Lawrence et al ³ 1991	Present study 2003
1. Tell-show-do	1. Tell-show-do	1. Tell-show-do
2. Positive reinforcement	2. N ₂ O	2. N ₂ O
3. Mouth prop	3. Voice control	3. General anesthesia
4. Voice control	4. Active restraint	4. Active restraint
5. Physical restraint, dentist	5. Hand-over-mouth	5. Oral premedication
6. Physical restraint, assistant	6. Papoose Board	6. Voice control
7. Hand-over-mouth	7. Oral premedication	7. Passive restraint
8. Sedation	8. General anesthesia	8. Hand-over-mouth
9. General anesthesia		
10. Papoose Board		

*Vertical lines (I) indicate mean values that were not significantly different between techniques (ANOVA and Tukey test).

and voice control have not shown much change over time and have lingered in the mid- to upper-acceptability levels.^{1,3} In examining the results of the 3 studies, there is an apparent trend toward a more acceptable ranking for sedation or oral premedication. In 1984, sedation was in the next-to-lowest rated group. In 1991, it remained there, but in 2004 it is secure in the midrange of acceptability.

Almost as confirmation of the rising acceptability of advanced pharmacologic methods of behavior management, general anesthesia has followed a similar but more dramatic rise in acceptability. In this study, general anesthesia was rated as the third most acceptable technique. This finding is noteworthy, as general anesthesia has not always been considered highly acceptable. General anesthesia was rated as the second least acceptable technique in the 1984 Murphy et al study, and was rated as the least acceptable technique in the 1991 Lawrence et al study.^{1,3}

It appears that parental acceptance of general anesthesia, relative to other behavior management techniques, has increased over the past 2 decades. This trend may be due to increased familiarity with outpatient general anesthesia. There has been a significant increase, in recent years, in the number of outpatient surgeries and outpatient surgical centers.¹³ Similarly, there has been significant growth in direct drug marketing to the public in the popular press.¹⁴ Contemporary parents, as opposed to parents in past decades, may more likely have had personal or family experience with outpatient general anesthesia. They may also have more likely encountered pharmaceutical marketing or seen surgical cases performed under general anesthesia on television. These parents may perceive treatment under general anesthesia or sedation as being a less severe or risky intervention.

Dental treatment under general anesthesia can now be accomplished in a way that parents may perceive as similar to nitrous oxide sedation (ie, performed at an outpatient site with a short recovery and no overnight stay). Thus, a convergence may be occurring in parental attitudes toward

these techniques, with nitrous oxide sedation remaining highly acceptable and general anesthesia rising in acceptability. Parents today certainly appear to be more comfortable with the idea of having their child treated under general anesthesia and sedation.

In this study, passive restraint ranked as the second least acceptable technique, with a mean VAS rating that was significantly different from all other techniques. The 49.7 mm mean VAS rating for passive restraint fell very close to the mid-point

on the scale between complete acceptability and complete unacceptability, and demonstrated wide variability, having the largest standard deviation of any of the techniques. This suggests that there is a particularly broad range of attitudes among parents toward this technique.

Passive restraint (labeled as Papoose Board) was ranked as the least acceptable technique in the 1984 Murphy et al study and the 1998 Scott and García-Godoy study.^{1,7} Passive restraint was rated as the third least acceptable technique in the 1991 Lawrence et al study.³ Frankel, however, found high acceptance for passive restraint among mothers whose children had been treated using the Papoose Board.⁹ Still, it appears that over 2 decades, with the exception of those whose children have undergone passive restraint, it remains, in general, an unattractive technique. Previous explanation, however, has the potential to alter the technique's acceptance. The diversity of opinion regarding this technique should be a clear signal to practitioners that unambiguous communication with parents is required when securing informed consent for the use of passive restraint.

Hand-over-mouth was rated as the least acceptable of this study's behavior management techniques, with a mean VAS rating that was significantly more negative than all other techniques. Hand-over-mouth was the only technique with a mean VAS rating in the more unacceptable range (50 mm or greater).

It appears that parental acceptance of this technique is declining. In both the 1984 Murphy et al study and the 1991 Lawrence et al study, hand-over-mouth ranked as the fourth least acceptable of the behavior management techniques.^{1,3} In the 1991 Wilson et al study, hand-over-mouth was rated as the least acceptable technique.⁵ Hand-over-mouth was rated as the second least acceptable technique in the 1998 Scott and García-Godoy study.⁷ Even given the more urgent scenarios presented by Fields et al, hand-over-mouth was widely viewed as unacceptable.² In light

of the mounting evidence that parents disapprove of hand-over-mouth, it is uncertain whether this technique will be used with any regularity in the decades to come.

Two trends appear to have emerged over the past 2 decades:

1. Aggressive physical management techniques—specifically passive restraint and hand-over-mouth—have decreased in acceptability.
2. The 2 most-often-used advanced pharmacologic techniques have increased in acceptability.

Several authors have described the growing importance of informed consent in behavior management. A study by Allen et al found that parents felt best informed when information was presented verbally, as opposed to in writing or through a videotape.¹⁵ That study also showed that, while parental willingness to give consent for a technique is related to parental acceptance of the technique, the relationship is not absolute. Hagen et al described the changing legal standard for informed consent. In many states, dentists must now disclose any information that a reasonable patient would want to know, rather than only the information that a reasonable dentist would choose to give.¹⁶

Choate et al found that most pediatric dentists were unaware of the informed consent standard in their state.¹⁷ Given the variability in parental attitudes toward behavior management techniques—particularly with respect to passive restraint—obtaining valid, well-informed consent from parents is critical when behavior management is necessary.

The results of previous studies suggest that there are several factors which may influence a parent's willingness to consent to a given behavior management technique. The dentist should keep these factors in mind when obtaining informed consent. As noted by Allen et al, an oral explanation of the technique is preferable.¹⁵ From Fields et al, it is clear that situational specific dental needs can modify parents attitudes toward techniques.² This is an important finding, and dentists should include an explanation of the urgency of the planned dental procedure when giving parents a rationale for the use of the aggressive behavior management techniques. It might also be helpful for the dentist to know of any previous experience the parent has had with any behavior management techniques. The findings of ElBadrawy and Riekman, Frankel, and Peretz and Zadik suggest that parents tend to approve of techniques once the technique has been used with their child.⁸⁻¹⁰

This study did not find that acceptability of behavior management techniques was influenced by parental age, gender, education level, or social status for a middle class sample comprised of approximately 80% females in their early 30s. Earlier studies have obtained similar results in terms of age,^{1-3,7,10} gender,¹⁻³ and educational and social status.¹⁰

Certain studies, however, have found some differences in attitudes between parents of different social status. Murphy et al found that parents of higher social status demonstrated less approval for general anesthesia than did parents of low social status.¹ Parents of low social status were more accepting of the Papoose Board and less accepting of active restraint when compared to parents of high

social status, according to Havelka, et al.⁴ The social status of the subjects in the present study was middle class. It is possible that if this study had included a broader range of social status among the parents, it might have revealed a relationship between social status and acceptance of individual techniques.

There are limitations to the present study. The sample size was adequate, but a larger sample of parents, including more private practice parents, would be desirable to provide more power to the analysis and a greater range of social status, as previously noted. It might also be useful to examine each subject's prior experience with behavior management techniques. This previous experience could be an important and confounding variable, because the findings of ElBadrawy and Riekman, Frankel, and Peretz and Zadik suggest parents tend to approve of behavior management techniques once the technique has been used with their child.⁸⁻¹⁰

New behavior management techniques will continue to be developed. Kuhn and Allen reviewed 3 emerging behavior management techniques: (1) contingent distraction; (2) live modeling; and (3) contingent escape.¹⁸ As the use of these and other new techniques becomes more common, investigations into parental attitudes toward their use will be necessary. It will also be important to continue to re-evaluate parental acceptance of traditional behavior management techniques.

The results of this and earlier studies show that parental attitudes toward these techniques can be confirmed at one point in time by multiple studies, but that opinions are variable among parents and subject to change over time. To help maintain optimal dentist-parent communication, parental attitudes towards behavior management techniques must be re-examined regularly.

Conclusions

Based on this study's results, the following conclusions can be made:

1. A modified hierarchy of acceptability is emerging in behavior management techniques.
2. Aggressive physical management techniques (passive restraint and hand-over-mouth) appear to be less favorably accepted.
3. Advanced pharmacologic techniques (sedation and general anesthesia) are increasing in acceptance over time.

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ABSTRACT OF THE SCIENTIFIC LITERATURE



ANTICARIES EFFECTIVENESS OF FLUORIDE-CONTAINING DENTRIFICES

The aim of this article was to compare the anticaries effectiveness of a low dose (500 ppm F) sodium fluoride, high dose (2,800 ppm F) sodium fluoride, and an experimental 0.454% stannous fluoride (1,100 ppm F) with sodium hexametaphosphate (SnF₂-HMP) dentifrice, relative to a standard 1,100 ppm F as a control dentifrice. This randomized, double-blind study was conducted for 24 months. Approximately 239 subjects per group, with a mean age of 10.6 (9 to 12 years old) were randomly assigned to 1 of 4 dentifrice treatments. Two examiners measured visual-tactile caries as DMFS supplemented with radiographs at baseline, 12, and 24 months. They found that the high-fluoride group and the stannous fluoride groups had statistically significantly less caries than the control group. The low-fluoride group was not statistically more significant than the control group. This study demonstrates that the 17% to 25% caries reduction observed by the stannous fluoride dentifrice relative to the control represents a clinically significant benefit.

Comments: This study shows no differences in caries reduction between 500 ppm and 1,100 ppm fluoride dentifrices. We can prescribe the use of 500-ppm fluoride dentifrices in young children without compromising the desired anticaries effect. Also, in populations with high caries risk, stannous fluoride dentifrice again shows its superiority over sodium fluoride, possibly due to the combination of effects of fluoride and tin. JLC

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