

Pain management in school-aged children by private and public clinic practice dentists

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Abstract

A mail survey of 198 Seattle dentists who treat children assessed their beliefs about pain control in school-aged children and examined the relationship of those beliefs to pain management behaviors. The survey population of general dentists and pediatric dentists in clinics and private practice had a response rate of 89.6%. Two of three dentists always use local anesthetic when doing restorations or extractions and also provide more anesthetic at the child's request. One in three dentists never provides postoperative medication following tooth extractions. Ten percent regularly deny child pain and many do not believe child pain reports are valid. Dentists who work in private practice are more likely to provide local anesthetic than are dentists who work in clinics. Dentists who desire more control over a child are less likely to provide local anesthetic. Dentists who question children about comfort are more likely to provide additional anesthetic based on a child's report of discomfort and to provide postoperative medication if the dentist perceives a dental procedure to be painful. (Pediatr Dent 16:294-300, 1994)

Introduction

Pain management is an essential skill for health care providers. In recent years, new information has revolutionized approaches to pain control — the traditional concept that pain is directly proportional to the nature and extent of the injury is no longer accepted. Rather, considerable evidence documents inadequate management of children's pain,¹⁻⁶ primarily due to dentist denial of analgesia. Outdated beliefs and misperceptions regarding children's pain are common among health professionals and need to be recognized and challenged.⁷

A fairly new and growing literature cites the influence of developmental factors on pain parameters such as pain threshold and pain coping. Relatively little is known about developmental changes in the nervous system itself that result in changes in pain perception, but studies of pain thresholds have been done. Haslam,⁸ studying children aged 5 to 18 years old, found that pain thresholds may be somewhat higher for older children. Lollar, Smits, and Patterson⁹ confirmed this finding clinically.

Cognitive development has been shown to result in changes in coping in dental and medical settings. Curry and Russ¹⁰ found age-related increases in cognitive coping in 8- to 10-year-olds undergoing dental treatment. Brown, O'Keefe, Sanders, and Baker,¹¹ in a study of 8- to 18-year-olds, found that children cope better as they get older. Similarly, in studies of first to seventh graders, LeBaron and Zeltzer¹² and Band and Weisz¹³ found that change in self-control and coping in medical settings is dependent on changes in cognitive development. As children develop, they learn to recognize the

benefits of pain and to accept painful procedures with less disequilibrium.¹⁴

Finally, psychological factors⁷ have a profound effect upon child pain behavior. Repeated painful experiences — often justified by providers and parents in emergency situations — may sensitize children and lower future pain thresholds.¹⁵

While the contemporary dental literature recognizes the subjective nature of pain,¹⁶ inadequate pain control for routine dental care — at least for adults — appears to be relatively commonplace. Kaufman et al.¹⁷ surveyed dentists who reported that 13% of all adult patients receiving restorative procedures in the previous five practice days were not adequately anesthetized.

Studies of dental pain management in children are rare. Pain control studies focus on pharmacological management of operative pain and anxiety, especially with the use of sedative agents. Studies of local anesthetic use and effectiveness have been limited and tend to focus on maximum dosage and potential toxicity.^{18,19} Few studies address postoperative pain problems. In an unusual paper, Fung et al.²⁰ studied the postoperative pain reports of 5- to 14-year-old children. Pain was reported by 57.5% of the children immediately following treatment and was related to age, distress, and who accompanied the child. The pain report was greater when the mother was present.

Dentists' perceptions of child pain and beliefs regarding pain management of children have not been reported. This report, part of a larger study of child management practices, describes dentists' self-reported management of school-aged child pain and beliefs about child dental pain.

Methods and materials

Subjects

Sampling procedures. Dentists from the Seattle, Washington, area were selected who were likely to treat a significant number of school-aged children (at least 5%). They then were divided according to whether they had a high or low likelihood of treating economically disadvantaged children.

Dentists were selected in conjunction with a longitudinal study of students in the Seattle Public Schools that focuses on dental use and dental fear in school-aged children. Mothers provided the child's name, the parent or guardian's name and signature, and the name of the dentist or dental clinic the child visits. A list of 154 dentists who treat economically disadvantaged children was compiled. There were 117 private practitioners and 37 dentists who worked in low-fee dental clinics that primarily serve the poor.

Dentists who were less likely to serve the economically disadvantaged were selected from a list compiled by the Washington Dental Service, a nonprofit dental services contractor for the Seattle metropolitan area. This list contained the names of 944 dentists and the number of child prophylaxes each had performed in the previous year. A higher number of child prophylaxes indicated a greater likelihood of treating children. Therefore, 470 dentists who were above the mean in child prophylaxes performed in the previous year, and who were not also among those selected previously as treating economically disadvantaged children, comprised a pool. The overlap between the two pools of dentists was relatively small. Eighty names from this pool had been used previously for pilot testing of the instrument and were deleted. One hundred names then were selected randomly from the remaining 390. Two of these dentists were no longer at the addresses available. Thus, 98 dentists comprised the group that was considered likely to treat school-aged children, but not likely to treat large numbers of economically disadvantaged patients.

Instrument¹

Questions were contained in a 143-item, 11-page booklet formatted in the Dillman style²¹ and pretested before use. The majority of the items were written as 7-point Likert-like scales with choices such as "strongly disagree—strongly agree" or "never—always." These items were organized into conceptual groups, and the items within the groupings were subjected to factor analysis (principal components, orthogonal rotation) to form scales. The scales are expressed as the median of the item responses and range from 1 to 7 as do the items. In addition, the dentists rated 13 treatment procedures separately for pain and unpleasantness and arithmetic means of these two sets of responses were used in the analysis. The choices ranged from 1 (not at all) to 7 (extremely). The scales were checked for inter-

nal consistency using Cronbach's coefficient alpha. Scales with a < 0.5 were revised or rejected resulting in 21 scales with a = 0.50–0.93, organized into nine conceptual areas.

Ten of the scales, organized into two conceptual areas, were used to prepare this report. One set of scales assessed child pain management; the other set assessed beliefs about children thought to influence child pain management. The pain management scales included the following: frequency of local anesthesia use (three items), frequency of giving additional anesthetic at child request (two items), and frequency of providing postoperative pain medication (two items). The set of beliefs included:

- Comfort with children (three items)
- Percent of frustrating encounters with school-aged children (one item)
- Dentist's need for control over the child (12 items)
- Painfulness and unpleasantness of typical dental procedures (two scales constructed from 13 items each)
- Denial of child pain report (three items)
- Comfort in communicating with the child about distress (four items).

Table 1 lists the conceptual areas and questions.

Analysis plan

The first section presents beliefs the dentists report including comfort treating children, communication with children about distress, frustration with school-aged children, and the need for control over the child. The second section describes the dentist's pain management responses. Following these data, we investigate the hypothesis that dentists' beliefs are related to dentists' pain management behavior.

The data were analyzed using SPSS Release 4 (SPSS Inc., Chicago, IL). Logistic regression was used to examine the relationship between beliefs and pain management practices.

Results

Response rate. Surveys were mailed to 252 dentists (154 treating low-income children and 98 treating other populations) in Seattle and King County using the Dillman method.²¹ A \$5 incentive was included. Thirty-one dentists were excluded; they returned the survey incomplete, generally indicating that their clientele did not include at least 5% school-aged children. Of the remaining 221 dentists, 129 were associated with the longitudinal study of dental use and dental fear previously mentioned, and 92 were private practitioners taken from the WDS list. The overall return rate was 198 of 221 (89.6%).

Characteristics of respondents. Almost all of the dentists were in general practice. Nearly 90% of the respondents were in private practice (173/196). The remainder were in private (11/196) or public (12/196)

nonprofit clinics. In this section we describe the dentists' practices. No statistical tests were conducted because the private practice dentists represent individual firms while the clinic dentists are nested within clinics. Nevertheless, the descriptive data are informative. The dentists spent about 32 hr per week on average at chairside with a range of 5 to 48 hr. The typical practice had three to four operatories (median = 4) with a range of one to eight operatories. About one-fifth (41/191) rated themselves as "overworked but providing care to all who requested appointments," while the others rated

their workloads as "not overworked" (68.6%, 131/191) or "not busy enough" (9.9%, 19/191). Only 37% of the dentists in private practice and none of the dentists working in clinics could schedule a new patient exam within 7 days. The majority of clinic dentists had a waiting period of more than 2 weeks. The typical patient waited less than 5 min to see the dentist after arriving at the practice.

The practices saw children who lived predominantly in areas with fluoridated water (less than 10% of respondents had more than 50% of their patients outside fluoridated areas, and more than 80% had at least 70% receiving fluoridated water). Because there were no major differences between the private practice and clinic dentists on any of the main scales in the study, the dentists' responses were combined for analysis.

Dentist beliefs regarding children

Comfort with children. The typical dentist indicated weak agreement with the scale of items indicating confidence in treating school-aged children (median = 5.3 where 4 indicates a neutral response and 7 indicates strong agreement). Two-thirds (130/198, 66%) showed a fairly neutral or weakly positive or negative response (score 3–5), while 30% (59/195, score 6–7) indicated considerable comfort in working with children. Very few of the dentists (6/195, 3%, score < 3) indicated discomfort in working with children.

Communicating about distress. The median dentist response to questions regarding communication with the child about pain and anxiety was 5, indicating some, but not frequent, use of various communication techniques. Only a small proportion of dentists (10/197, 5%) reported that they never use these communication strategies (score < 3)

Table 1. Belief and pain management scales and items*

Belief Scales

- Comfort with children (LIKEKIDS)
 - Enjoy working with children
 - Feel confident treating school-aged children
 - Difficulty working with children relative to adults
- Percent frustrating encounters with school-aged children (SCHLAGED)
- Dentist need for control (CONTROL)
 - Importance of establishing control with child patients
 - Dealing with uncooperative child is a battle of wills
 - Dismissing uncooperative child before completing treatment feels like defeat
 - Dismissing uncooperative child before completing treatment feels like neglect of duty
 - Dentist should not present treatment choices to children
 - Child should not know much about treatment
 - School-aged children try to interrupt treatment by asking questions
 - School-aged children try to interrupt treatment by going to the bathroom
 - School-aged children are manipulative
 - Use equipment to help divert the child's attention
 - Let child feel control over the situation
 - Use tell-show-do
- Communicate with child about his/her distress (ASKCHILD)
 - Ask if in pain or discomfort
 - Ask if afraid or nervous
 - Encourage child to notify of difficulty swallowing
- Painfulness of procedures for school-aged child (PAIN, see Table 2)
- Unpleasantness of procedures for school-aged child (UNPLESNT)
- Denial of child pain report (KIDPAIN)
 - Difficult to know when child is in pain
 - Children confuse pain and pressure
 - Difficult to know when child's pain report is genuine

Pain Management Scales

- Use of local anesthetics (LOCAL)
 - Before deciduous extraction
 - Before occlusal filling in deciduous tooth
 - Before occlusal filling in permanent tooth
- Give additional anesthetic at child's request (MOREANES)
 - During drilling on deciduous tooth
 - During extraction of deciduous tooth
- Providing postoperative pain medication (POSTOP)
 - After deciduous tooth extraction
 - After permanent tooth extraction

* The acronym used in the correlation and regression tables is given in parentheses.

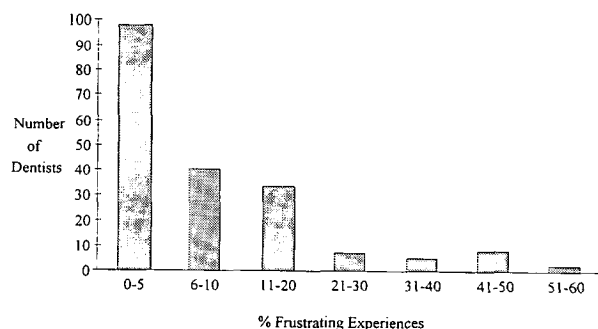


Fig 1. Distribution of percentages of dentist-reported frustrating encounters with school-aged children.

with school-aged children in distress. More than one in four dentists (27%, 53/197, score 6–7) report always using these techniques; the remainder neither strongly endorse nor reject these techniques.

Frustrating encounters. Fig 1 presents the distribution of frustrating school-aged child patient encounters reported by the dentists. The majority of dentists report a small percentage of frustrating experiences with the median response at 5% (9/186). The range of responses was from 0 to 60%. Thirty-nine dentists (21%) reported 20% or more frustrating child visits.

Dentist control. No dentist response indicated strong agreement or disagreement with statements indicating the importance of dentist control over the child. The median response was 4.4. There was, however, a range of responses within the “neutral” category. Twenty-six percent (49/187) of the dentists indicated some disagreement (< 4 on a 7-point scale where score 1 was disagree strongly). The remainder indicated modest agreement or were neutral.

Table 2. Pain and unpleasantness ratings*

Procedure	Pain Rating			Unpleasantness Rating		
	\bar{x}	(SD)	Rank	\bar{x}	(SD)	Rank
Drilling without anesthetic	4.7	(1.8)	1	5.0	(1.6)	1
Excavating caries without anesthetic	4.1	(1.6)	2	4.6	(1.6)	4
Receiving an injection	3.8	(1.3)	3	4.7	(1.5)	2
Extracting a permanent tooth	2.8	(1.5)	4	4.7	(1.5)	2
Placing/using rubber dam	2.7	(1.0)	5	3.8	(1.3)	8
Radiographs	2.6	(1.1)	6	3.4	(1.3)	9
Extracting a deciduous tooth	2.5	(1.2)	7	4.1	(1.5)	6
Repairing a fractured tooth without anesthetic	2.5	(1.2)	7	4.1	(1.5)	6
Impressions	2.2	(1.2)	9	4.2	(1.3)	5
Teeth cleaning	1.8	(0.8)	10	2.8	(1.2)	12
Receiving a filling	1.7	(0.8)	11	2.8	(1.3)	12
Drilling with anesthetic	1.6	(0.7)	12	3.2	(1.4)	10
Sealants	1.4	(0.6)	13	3.0	(1.4)	11

* Scale 1–7, 7 = extremely painful or unpleasant.
N = 141 dentists.

Pain and unpleasantness. Table 2 presents pain and unpleasantness ratings for a school-aged child for 13 dental procedures. Mean dentist ratings indicated that most dental procedures were believed to be not at all painful for school-aged children. Only three procedures were considered somewhat painful (receiving an injection, score 3.7; excavating caries without anesthesia, score 4.1; and drilling without anesthesia, score 4.7). On the other hand, the mean ratings of 11 of the 13 procedures were only somewhat unpleasant. No procedures received mean ratings at the extremely unpleasant end of the scale. Results indicate less dentist variation in rating painfulness than rating unpleasantness. The least variation was found for rating painfulness of sealants, drilling with an anesthetic, and teeth cleaning. The greatest variation was found for unpleasantness of primary tooth extractions, injections, drilling with anesthetic, and sealants.

Denial of child pain report. While 80% of dentists (157/197) gave a neutral response regarding the validity of childrens’ reports of pain during treatment, strong agreement and disagreement were almost equally divided. Ten percent (19/197) strongly disagreed with denial of child pain (endorsing the child’s pain report), while 11% (21/197) strongly agreed with the denial of the child’s pain report.

Child pain management

Use of local anesthetics. The ratings show that almost all dentists (99.5%) use local anesthetics with children when doing restorative dentistry or extractions. About two of three dentists “always” use local anesthetic (64%, 125/197) and “always” provide additional drug (67%, 132/197); 36% “sometimes” use local anesthetic (71/197) and 29% “sometimes” provide additional drug (56/197).

Table 3. Pearson correlations between beliefs scales

	LIKEKIDS	ASKCHILD	CONTROL	UNPLESNT	KIDPAIN	PAIN	SCHLAGED
LIKEKIDS		-0.02	0.22 [†]	0.23 [†]	0.22 [†]	-0.27 [†]	-0.52 [†]
ASKCHILD			0.34 [†]	0.03	0.06	0.00	-0.07
CONTROL				-0.03	0.26 [†]	-0.09	-0.32 [†]
UNPLESNT					-0.05	0.44 [†]	-0.16 [*]
KIDPAIN						-0.12	-0.30 [†]
PAIN							0.25 [†]

* $P < 0.05$.

† $P < 0.01$.

Table 4. Logistic regression examining dentist pain control behavior*

Independent Variable	Concept	LOCAL Odds Ratio (CI)	MOREANES Odds Ratio (CI)	POSTOP Odds Ratio (CI)
LIKEKIDS	Like working with children			
ASKCHILD	More likely to ask child about pain		1.65 (1.19, 2.29)	
CONTROL	Desire greater control over child	0.43 (0.19, 0.96)		
UNPLESNT	Rate procedures as more unpleasant			
DENTTYPE	More affluent practice	3.74 (1.35, 10.34)		
PAIN	Rate procedures as painful		0.49 (0.26, 0.95)	1.94 (1.07, 3.52)
KIDPAIN	Child pain reports are valid			

*Dependent variables are coded 0, 1 where 1 indicates greater pain control behavior.

Providing postoperative pain medications. A majority of dentists (53%, 103/195) indicated that they sometimes provide or dispense pain medication after tooth extraction. While 11% (22/195) indicated they always provide pain medication in such circumstances, 36% (70/195) reported that they never provide pain medication for children following a tooth extraction.

Relationships between the scales

Table 3 provides the Pearson product moment correlations between the various scales.

Hypotheses testing

In an attempt to test the hypotheses about the relationship between beliefs and pain management practices, three logistic regression analyses were performed where the dependent measure was one of three dichotomous behavior scales (use of local anesthetic, providing more local anesthetic at child request, and prescribing postoperative pain medication) and the independent variables were the beliefs scales. The dependent variables were dichotomized as follows. For both the local anesthetic scale and more anesthetic scale, score 0 was providing local anesthetic only sometimes or less frequently while score 1 was providing local anesthetic more often. For the postoperative medication scale, score 0 was providing medication infrequently while score 1 indicated sometimes or more often. The beliefs were entered in the model as continuous variables. The type of dental practice, private office

(score 2) or public/private clinic (score 1), was entered as a control variable (DENTTYPE).

Results are presented in Table 4 as odds ratios with a 95% confidence interval in parenthesis. An odds ratio describes the effect of an independent variable (e.g. beliefs) on a dependent variable (e.g. behavior). For example, the use of local anesthetic (labeled LOCAL in Table 4) was found to be related to the dentist's need to have control over the child (CONTROL), with greater need for control associated with less use of local anesthetic. The odds ratio of 0.43 indicates that an increase of one unit on the CONTROL scale is associated with a decrease by a factor of 0.43 in the odds for use of local anesthetic. The 95% confidence interval (0.19, 0.96) gives a range of plausible values for true odds ratio. The fact that it does not contain the value 1 means that the effect of CONTROL on LOCAL is statistically significant at the 5% level of significance.

All odds ratios determined to be statistically significant are displayed in Table 4. The use of local anesthetic was also found to be related to type of practice (DENTTYPE) with private practice dentists' odds for using local anesthetic 3.74 times higher than dentists in public/private clinics. The use of additional anesthetic (MOREANES) was associated with asking the child about comfort (ASKCHILD) and with lower ratings of the painfulness of dental procedures (PAIN). The use of postoperative pain medication (POSTOP), on the other hand, was associated with higher ratings of pain.

Discussion

Descriptive data

Children report that they dislike going to the dentist because it hurts.²² Results from this study indicate that about two-thirds of dentists always provide local anesthetic and additional anesthetic upon child request. It is the standard of care for them in controlling pain. The use of local anesthetic for the remaining third remains a matter of professional judgment. The use of pain medication following tooth extraction is even less common. About one-third of the dentists never provide postoperative pain medication.

Many dentists believe dental care for children is not particularly painful but only unpleasant, and a substantial proportion deny the reality of child dental pain. They tend to believe children confuse pressure with pain or knowingly present false or exaggerated responses, possibly in an attempt to escape the dental environment. While only about 10% of dentists strongly support this position, only about 10% strongly disagree. It should be noted that adults' and children's perceptions of pain often are not congruent. Lollar et al.⁹ found that adults consistently underestimated the intensity of children's pain.

Hypothesis testing

This research investigated the relationship between dentists' attitudes and pain control management behaviors. The focus was on school-aged children as they are especially vulnerable to developing phobias and subsequent avoidance behavior.²³ We hypothesized that dentists would be more likely to employ local anesthetic when drilling, provide more anesthetic in response to child distress, and more often dispense or prescribe postoperative pain medications if they had greater comfort with children, valued the importance of communication with children, had less need for control over the child, rated procedures as more painful/unpleasant, and accepted child pain reports as valid.

The results (Table 4) lend some credence to the hypothesized relationships but were not consistent across the three types of behaviors. Dentists who expressed a greater need for control over the child's behavior were less likely to provide local anesthetic. That is, a dentist who needs less control (where 95% of the dentists report needing more control) is more than twice as likely to use local anesthetic "always" versus "less often" compared with the typical dentist. This is even more striking in that dentists who are more likely to care for poor children are almost four times less apt to provide anesthetic even though these children may experience more severe dental disease and present more complex management problems.²⁴ This finding may reflect a short-term, production-oriented public health point of view. Given demands on limited public funds, it is easy for dentists and administrators alike to point to units

produced per unit time without consideration of other, more meaningful outcomes.

In a seemingly contradictory finding, dentists who rated dental procedures on average as less painful were more likely to respond with additional anesthetic in response to child distress. Again, a dentist who rates procedures as less painful than other dentists (difference of 1 on the pain scale), is more than twice as likely to provide more anesthetic in response to the child "always" versus "less often." It may be that dentists who see dental procedures as more painful are unwilling to subject children to the pain and trauma of additional injections. On the other hand, a dentist who "always" (81% of the dentists use these techniques "less often") asks children about their comfort is 1.6 times more likely to use additional anesthetic as the typical dentist. These findings are valid even after adjustment for practice type. Similarly, dentists who rate dental procedures on average as more painful (90% of dentists rate them less painful) were nearly twice as likely to provide postoperative pain medications "always" versus "less often." This finding holds true after adjusting for the type of practice. In summary, dentist beliefs about child pain appear to influence pain management practices.

Pain is always subjective; it is influenced by a large number of factors such as beliefs, emotions, expectations, past experiences, and learning.⁶ Child dental or medical pain often has a strong emotional component. Such procedural pain often is exacerbated by anxiety and by a perceived or actual lack of control within the clinical setting. One recent study found that children who perceived a lack of control and received painful treatment were 13.7 times more likely to be highly fearful and 15.9 times less likely to be willing to return to the same dentist.²⁵ Similarly, another study showed that fearful children who had no control in a previous visit, wished increased control in subsequent visits (unpublished data).

On the other hand, dentist behavior that serves to lower anxiety and enhance at least perceived control will reduce child pain.²⁶ The ability of the dentist or physician to communicate with a child about these issues may be all that is needed to reduce child fear. Asking children about pain or comfort or whether they are frightened, and encouraging them to tell you when they feel pain puts children at ease; it lets them know the adult who is in charge is concerned. Such an approach reduces fear.²⁷ Asking also gives the child some control, and it is clear from many studies that control reduces pain. It is therefore paradoxical that the some dentists should vie with their child patients for control. The best way to maintain control of children may be to share it.

This study provides some evidence for the relationship between dentists' beliefs about school-aged children and pain management behaviors. Nevertheless,

many of the attitudes and their relationship to behavior may be inconsistent and even clinically inappropriate. It is time to focus our predoctoral educational and continuing educational efforts on contemporary theories of pain, to enhance dentists' skills in behavioral aspects of pain management, and to create a new standard of care for dental pain management in children.

There has been little focus on school-aged children and pain control in the pediatric dentistry literature. This study, although descriptive and limited to dentists in one geographical area, is strengthened by the inclusion of dentists who serve both the poor and more affluent. On the other hand, given the relative absence of instruments to measure dentists' pain control practices and beliefs, the labels the researchers used and the way the concepts were instituted reflect the biases of the investigators. Additional investigation in this area is needed.

Conclusion

1. While a large proportion of dentists provide optimal pain control, one-third do not always use local anesthetic when doing restorations or extractions.
2. Dentists' beliefs about child management procedures such as dentist control and communication about distress were relatively neutral, yet 10% of dentists regularly deny child pain and many do not believe child pain reports are valid.
3. Associations exist between the use of pain control procedures and child management beliefs.

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¹A copy of the instrument is available from the senior author.

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