

Factors influencing the use of behavioral management techniques during child management by dentists

M.O. Folayan* / E. Idehen**

Dental anxiety develops from a vicious cycle of bodily arousal from dental stimuli, cognitive interpretation and ineffective coping all working in a runaway feedback loop. Behavioral management strategies (BMT) aim at cognitive reorientation, which results in better compliance with instruction. This paper therefore tried to find out possible factors that influence the effective use of BMT during child dental management during treatment by dental operators in Nigeria. The levels of anxiety pre and post treatment were assessed using the short form of the dental version of the Child Fear Survey Schedule. Also, the type of treatment given to the child, the types and number of behavioral strategies employed during dental management as well as the gender and age of the child were noted. The professional status of the attending dental operator was also noted. Prior to the commencement of the study, the five students in the final year, who were to attend to the children in this study received one week training on the psychological management of dental anxiety in children. Results obtained from the dental operators were compared. The type of treatment received by the child did not significantly affect the dental anxiety score. The number of techniques combined by house officers and senior registrars were significantly higher than would be expected by chance ($\chi^2=16.030$, $P=0.0001$ and $\chi^2=9.000$, $P=0.0001$ respectively). Combination of techniques was also more frequent during invasive procedures and when dental anxiety levels were high. Combining techniques also tended to decrease dental anxiety more significantly than otherwise. Training has a role to play in the basic and efficient use in the management of the child dental patient. The training of dentists should thus entail the full spectrum (content and instructional effectiveness) of all psychological techniques.

J Clin Pediatr Dent 28(2): 155-162, 2004

INTRODUCTION

One major aspect of child management in the dental chair is managing dental anxiety, a worldwide problem and universal barrier to oral health care and service provision. Management involves either prevention or treatment where anxiety has already developed. Both forms of management usually entail the use of behavioral management strategies ranging from informal and common sense methods to formal relaxation techniques.

Formal relaxation techniques vary from pre appointment preparations, which entails trying to get the child to relax during treatment by viewing audiovisual products, to exposing the child to tape-slide scenes before the first dental examination with the product

giving an explanation about a first dental visit so that the child may not view the appointment, dentist and dental staff as a serious threat.^{1,2} The child patient may also learn about dental experience by viewing other children receiving dental treatment. It involves either live or filmed models and has been used in several investigations and reported to be effective in preventing anxiety development.^{3,8} This is known as modeling.

There is also the "Tell-show-do" technique described by Addelston in 1959.⁹ It entails giving the child a very careful explanation of a procedure and equipment before the procedure is done and the equipment used. There is also the need to demonstrate the use of a tool before the actual procedure so that the child may understand what is been said. Holst and Ek¹⁰ study reported that the use of this method throughout dental treatment for children in general dentistry resulted in an increase in positive acceptance of all treatment steps encountered and the time spent per child diminished compared with the period before the approach was introduced.³

Distraction is also a psychological strategy, which helps people cope with brief stressors.¹¹⁻¹³ This skill is almost unteachable. It entails skillful communication

* M.O. Folayan, Department of Preventive Dentistry, Obafemi Awolowo University, Ile-Ife, Nigeria. Send all correspondence to Dr. M.O. Folayan.

E-mail: mukpong2@yahoo.com

** E. Idehen, Department of Psychology, Department of Preventive Dentistry, Obafemi Awolowo University, Ile-Ife, Nigeria.

with the dentist talking in a stream fashion with the aim of diverting the attention of the patient from noxious stimuli and to manipulate the perceptions and expectations of the child. It is very useful in children with a short attention span.¹⁴ This points to the need for the dentist to develop good communication skill.¹⁵

Physical contact in the form of patting and stroking also tend to be effective in reducing anxiety that may accompany dental care.^{16,17} However, a touch given without accompanying verbal statements can be perceived as threatening or unfriendly¹⁸ especially amongst children from low income families.¹⁹ This may be because these children from low income have lives, which may be more frequently characterized by instability and insecurity and may be sensitized to strangers who may be less benign than those encountered by high income children.¹⁹

A technique found to be effective in preventing dental anxiety developing in a child, who has a potential to do so, is the use of positive reinforcement. Here, the child is praised and given gifts when he shows acts of cooperation. The child is further encouraged to continue to cooperate by coaxing, petting and use of persuasion when the child shows signs of poor cooperation.^{15,20}

A variation to the above is the desensitisation technique. This technique is effective for children who have developed dental anxiety. It entails gradual exposure of the child to dental treatments for short periods of time starting from the non invasive procedures such as simple polishing. The dentist only moves up to the next grade of treatment when the child has become comfortable with a level of treatment. This way, the child is gradually helped to confront whatever is the source of dental anxiety and thereby, overcome it. It is a time consuming technique, but very rewarding as the child eventually becomes comfortable with dental procedures.⁹

These established strategies have been found to be more effective than informal and common sense methods.^{21,22} This points to the importance and need for training dentists in the application of psychological methods for the effective handling and management of anxious patients.

Patients managed with psychological techniques often show significant improvements in their conditions when compared with other techniques.^{23,24} This is because the strategies enhance trust, feelings of control and the development of coping skills in both the child and professionals. However, not every dental operator who handles the child is conversant with the use of these skills.

This paper therefore sorts some of the possible factors that influence the effective use of behavioral management techniques in child dental management by dental operators in Nigeria. An understanding of some of these factors that affect the efficient an effective use of behavioral management techniques would

enhance the teaching of these skills during the training of members of the dental health team.

MATERIAL AND METHODS

The study was conducted at the Paediatric Dental Unit of the dental hospital in the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC) Ile-Ife, Nigeria. Seventy-four first time attendees between the ages of eight and thirteen years seen at the clinic over a period of 12 months were included in the study. Those with past medical history of major mental and physical disorders were excluded.

The measures taken in this study were (1) level of anxiety, which was assessed by means of the short form of the Dental Version of the Child Fear Survey Schedule (CFSS-SF);²⁵ (2) the professional status of the attending dental operators; (3) the presenting complaints, diagnosis and types of treatment administered for each patient. For ease of data analysis, the types of treatment was divided into two: (a) invasive procedures requiring the use of local anaesthesia such as extraction, amalgam restoration and suturing, and (b) non-invasive procedures that did not involve the use of local anaesthesia such as scaling and polishing, fluoride therapy, examination and prescription of medication, impression taking; (4) the types of behavioural management techniques employed during the dental management; (5) the number of behavioural management techniques employed during the dental management. The types and numbers of BMT used by the dental operator was noted by one of the investigators by standing quietly and observing and recording what was being done during the dental management of the child. In addition, the ages and gender of both the child and the dental operators were noted. Note was also taken about whether the dental operators had received any formal training in any form on dental anxiety management in children.

The pre- post-treatment design was used in this study. That is, the CFSS-SF was administered on the patients twice. The first administration of the CFSS-SF took place on the first attendance at the clinic. This was before the patient was examined, diagnosed and/or under went any form of dental procedure. The second or post-treatment administration of the CFSS-SF took place two weeks after the first during the check-follow-up visit to the clinic. Both administrations of the CFSS-SF were done by the first author in the waiting hall of the clinic, while patients were waiting to be attended to by the dentists.

The dental operators, who were included in the study, were 5 students, 3 house officers, 2 residents and 1 senior registrar. The five students in were in the third and final clinical year, who were having postings in the Child Dental Health department and would normally be attending to patients during this study period. They received one-week training on the psy-

Table 1. Mean anxiety scores by type of treatment

Types of Treatment	Pre-treatment			Post-treatment		
	n	Mean score	SD	N	Mean score	SD
Invasive	24	15.625	5.323	24	14.375	4.392
Non-invasive	50	17.040	10.953	47	13.149	4.299

Note: Differences in n is due to the loss of three patients at the post-treatment assessment.

Table 2. Mean dental anxiety scores of children managed by status of dental operators

Status of Dental operator	Pre-treatment			Post-treatment		
	No of patients	Mean score	SD	No of patients	Mean score	SD
Student	24	16.167	14.859	21	12.191	4.226
House officer	31	15.323	4.475	31	13.871	4.653
Registrar	7	16.143	5.146	7	12.429	3.102
Senior Registrar	12	20.917	6.360	12	15.833	3.563

Note: Differences in n due to loss of 3 patients at the post-treatment assessment.

chological management of dental anxiety in children. This consisted of two 2-hours lectures and one week clinical demonstrations of the various psychological techniques of managing anxiety in children. Following this training the students were tested through a practical demonstration of their skills and competence. Each of them was observed handling at least one patient. The 3 house officers and 2 registrars on the other hand, had not at any time received formal training on anxiety management strategies in children. The senior registrar had received some form of postgraduate training in dental anxiety management of children.

The data generated was analysed by various programmes of SPSS (Windows 98) version 6. Statistical significance was set at the conventional $p \leq 0.05$.

RESULTS

Thirty-four girls and 40 boys participated in the study. Their mean age was 11.04 ± 1.73 . The mean anxiety score of the children before treatment was 15.45 ± 5.49 . The post-treatment mean anxiety score decreased significantly to 13.26 ± 4.22 ($p > 0.001$).

The presenting complaints varied from “hole in tooth” to pain, referrals, dirty teeth and crowding. Diagnoses varied from gingivitis to caries, pulpitis, ANUG and dentoalveolar abscess. There were no statistically significant differences between the mean pre-treatment anxiety scores of the children on the basis of presenting complaints ($p = 0.141$) and diagnosis ($p = 0.107$).

Type of treatment received did not significantly affect the post-treatment anxiety scores of the patients

($P = 0.985$) The results remained the same even when types of treatment was categorised into invasive and non-invasive methods ($P = 0.263$). See Table 1. It was however noted that there was a greater decrease in post-treatment anxiety scores of patients managed by non-invasive methods when compared with that of the children managed by invasive methods.

There was no statistically significant relationship between the age and gender of the dental operators and the use of BMT (in terms of type and number).

Also, the professional status of the attending dental operator did not significantly affect the post-treatment anxiety level of the children ($P = 0.108$). See Table 2. Statistically significant decrease in dental anxiety level post-treatment occurred independent of the professional status of the attending dental operator.

The dental operators were noticed to use BMTs which varied from familiarisation with clinic before treatment (FBT) to tell-show-do (TSD), physical contact [stroking the child] (PC) and permitting child to raise hand to control dental procedure (PCR). Others were positive reinforcement and coaxing (PRC), explaining the entire procedure to child before undertaking treatment (EP), distraction (Dist), physical restraint [holding the child down to reduce disruptive movement during treatment] (PR) and modelling (Mod).

The students and the senior registrars used a wider spectrum of BMTs than the house officers and the registrars.

PC, PR, FBT, EP and Mod were never used never used alone but in combination with TSD, PCR, PRC and Dist. See Table 3.

Table 3. Distributions of Professional Status and Behaviour Management Techniques

BMT	Professional Status								Total	
	Student		House Officer		Registrar		Senior Registrar			
	Single	Combined	Single	Combined	Single	Combined	Single	Combined	Single	Combined
TSD	12	8	5	22	3	3	4	6	41	22
PC		2						2		4
PR		2				1				3
PCR	1	2		1		1		4	1	8
PRC	3	6		5	1	2	1	3	5	16
FBT								2		2
E.P										2
Dist.		2								2
Mod									1	1
	16	22	5	28	4	7	5	20	47	60
Total	38		33		11		25		107	

$\chi^2 (42) = 55.613, p=0.073$

Table 4. Professional status of dental operators and BMT combinations in patients

Group	Professional Status of Dentists				
	Student	House officer	Registrar	Senior Registrar	Total
Single	16	5	4	5	30
Combined	8	26	3	7	44
Total	24	31	7	12	74

$\chi^2 (3) = 6.366, P = 0.095$

Three patients were managed by use of restraint. The mean anxiety score decreased from 22.000 ± 7.071 to 18.500 ± 2.121 . Restraint was used in combination with other BMT.

There was no significant association between the combination of behavioral management techniques (BMTs) and the professional status of attending dental operator ($\chi^2 = 55.613, P = 0.073$). See table 3 and 4. However, the rates at which house officers and senior registrars combined BMTs were significantly higher than would be expected by chance ($\chi^2=16.030, P=0.0001$ and $\chi^2=9.000, P=0.0001$ respectively). When combination occurs, students and senior registrars used an average of about three techniques per patient. This was higher than that observed with house officers and registrars.

There was a statistically significant association between types of treatment and combination of BMTs

($\chi^2 = 4.865, P = 0.027$) with the combination of techniques been more frequent during invasive procedures. See Table 5.

Also, a significant difference was observed between the pre-treatment anxiety scores of patients managed with single BMT and those managed by combined BMTs ($t = -2.668, P = 0.010$). Those managed using a combination of techniques had higher pre-treatment dental anxiety levels. See Table 6.

The number of BMTs employed had a statistically significant effect on the post-treatment anxiety scores of the patients ($F = 2.961, P = 0.026$). See Table 7. Post-hoc checks showed that a significant post treatment mean anxiety dental score reduction occurred in patients managed by combination of two BMTs than those managed by only one (Mean Difference = 3.092, $P = 0.003$). There no other statistically significant differences when more number of BMTs were combined.

Table 5. Type of Treatment and combination of BMT

Type of Treatment	Single	Combined	Total
Invasive	5	19	24
Non-invasive	25	25	50
Total	30	44	74

$\chi^2 (1) = 4.865, P = 0.027$

Table 6. Comparison of post-treatment anxiety scores of single and combined BMTs

Type of BMT	N	Mean dental anxiety score	SD	df	t	p
Single	47	15.388	4.262	70	-2.668	0.010
Combined	24	17.390	4.194			

Table 7. Comparison of pre and post-treatment anxiety scores by number of BMT.

Number of BMT	Frequency of use	Mean pre-treatment anxiety score	Mean post treatment anxiety score
1	48	15.979±11.117	12.467±4.262
2	14	19.071±4.795	16.357±3.954
3	6	13.500±7.796	12.6000±4.278
4	3	18.000±7.000	15.667±4.509

DISCUSSION

The study was designed to try and identify some variable that may have influenced the use of BMT during the management of the child dental patient. Dental operators were observed during child dental management and various variables recorded. The import of the dental operators' age, gender, professional status, training and treatment on the choice and use of BMT in the management of behavior problems of children during treatment were then assessed.

The age and gender of the dental operators were found to have no effect on their decision, to use and choice of BMT. Although no significant relationship was found between the age and gender of the attending dental operator and use of BMT in child dental management, the study did not explore the possible effect of the dental operator's personal characteristics. This could possibly have significant impact on the use

of BMT. But then, these variance are not experimental confounds.

The mean dental anxiety score post treatment was observed to be lower for those who undertook non-invasive than for those who undertook invasive treatment. This comparatively lower change in the mean dental anxiety score following invasive procedures still occurred despite the increased tendency to combine strategies during management. This may be because the BMT employed during treatment such as the TSD involves a stream of communication, which may actually have aroused the focus of the child on the treatment procedure. This increases the tendency to perceive discomfort during treatment and in turn, may have reinforced the feeling that dental care is not exactly pain free but then, it is not as terrible as anticipated thus accounting for the noted post treatment decrease.

Past studies had shown an increased tendency for combining BMTs when managing anxious than in non-anxious patients.²⁶⁻²⁸ This study also had a similar finding. However, past studies had not related this tendency to the type of procedure undertaken. This study noted that BMT were more readily combined during invasive procedures than in non invasive ones. Combining more techniques during invasive treatment may be an anticipatory action on the path of the dental operator to prevent disruptive behaviours that might ensue with the perception of pain, from occurring. Efforts are thus made to minimise and forestall the development of disruptive behaviors. Although the BMTs employed may have succeeded in achieving this, they had not effectively decreased dental anxiety during invasive procedures as the result of the study showed a comparatively lower change in mean dental anxiety scores following invasive procedures when compared with non invasive ones (Table 1). Their effectiveness in decreasing dental anxiety could be enhanced when combined with proper pain management as perceived discomfort seems to play a significant role in affecting the dental anxiety level. There is, however, the need for further studies on the effect of pain on the effectiveness of BMTs in management of patients.

The use of restraining contact was noted only during invasive management of three children. All the three children needed dental extractions. They also had high dental anxiety scores. Contrary to expectations, this technique resulted in a decrease in anxiety level of the children. The effectiveness of its use in these patients may be because the behavioural management problems (BMP) exhibited by the child, which otherwise disrupts the treatment procedures may be due to reasons other than dental anxiety.²⁹ A study by Barton *et al.*³⁰ which showed that significantly higher number of patients who exhibited BMP necessitating the use of restraint had had negative experiences in the office of a physician or hospital, supports this postulation. Also, restraint was used in combination with other BMT. Despite the seemingly success achieved with the use of this technique in this study, the increasing tendencies for litigation and popularization of the concept of child abuse should limit its use. Its effectiveness appears to be limited to the management of highly anxious children and may be counterproductive in non-anxious children.²⁸

In this study, majority of patients was managed effectively with the TSD singly or in combination with other strategies. The effectiveness of the use of the TSD alone in reducing anxiety had earlier been highlighted by Murray and Niven.³¹ Also noted was an increased tendency for anxiety level to decrease when techniques were combined than when used singularly. The increased effectiveness of combining techniques over the use of a single technique may be because there is an increased tendency for both cognitive reorientation to take place in the child as well as enhance the coping ability of the child all at once. With the use of a single

technique, only one component of anxiety may be take care off at a particular time.

Findings from this study seem to show that training rather than the professional status of attending dental operators play a role in the choice of BMT. Although Roberts³² was critical about behavior management being taught as a technique, past studies have however established that behavioral science instructions in anxiety management apparently influence clinical behaviour³³. Also, the strength of such instructions not explored in this study is the ability of the instructed to detect anxious patients and this precedes successful management.³³ Training may thus have a role to play in the basic and efficient use of behavioral management skills.

This study had some methodological problems. A structured study where a controlled sample size per professional status per technique employed, may have helped draw some more statistically significant inferences. However, this study design was chosen so as to eliminate a conscious awareness on the path of the dental operators that their treatment modalities were been observed and recorded. This would help eliminate the possibility of operators making a conscious effort to appropriately manage their patients and this could significantly affect the result. It is our hope that future research efforts in this area would use a larger sample size so that there will be more degrees of freedom in the tests of effect and thus be able to claim significance at lower critical values.

Dental anxiety develops from a vicious cycle of bodily arousal from dental stimuli, cognitive interpretation and ineffective coping all working in a runaway feedback loop. Psychological management strategies aim at cognitive reorientation, which resulted in better compliance with instruction. The importance of the dental operator anxiety management skills, cannot be overemphasised as a determinant to the successful dental experience of the child.

REFERENCES

1. Baranie JT. Behavior modification techniques. In Ripa, L.W., Barenie, J.T. (eds). Management of dental behavior in children. Littleton, Massachusetts: PSG Publishing, pp 61-73, 1979.
2. Addeleston HK. Child patient training. Fort Rev Dent Soc 38: 7-9, 27-29, 1959.
3. Machen JB, Johnson R. Desensitisation, model learning and the dental behavior of children. J Dent Res 53: 83-87, 1974.
4. Melamed BG, Hawes RR, Heiby E, Glick J. Use of filmed modeling to reduce uncooperative behaviour of children during dental treatment. J Dent Res 54: 797-901, 1975.
5. Melamed BG, Weinstein D, Hawes R, Katin-Borland M. Reduction of fear-related dental management problems with use of filmed modeling. JADA 90: 822-826, 1975.
6. Melamed B, Yercheson R, Fleece TL, Hutcherson S, Hawes R. Effects of film modeling on the reduction of anxiety - related behaviors in individuals varying in level of previous experience in the stress. J Consult Clin Psychol 46: 1357-1367, 1978.
7. Klingman A, Melamed BG, Cuthbert MI, Hormecz DA. Effects of participant modeling on information acquisition and skill utilization. J Consult Clin Psychol 52: 414 - 422, 1984.

8. Venham LL, Goldstein M, Gaulin-Kremer E, Peteros K, Cohan J, Fairbanks J. Effectiveness of a distraction technique in managing young dental patients. *Pediatr Dent* 3: 7-11, 1981.
9. Pinkham JR. The roles of requests and promises in child patient management. *J Dent Child* 60: 169 – 174, 1993.
10. Klingberg G. Dental fear and behavior management problems in children. *Swed Dent J Supplement* 103: 1 – 78, 1995.
11. Weinstein P, Nathan JE. The challenge of fearful and phobic children. *Dent Clin N Am* 66:2 – 667, 1988.
12. Kuhn BR, Allen KD. Expanding child behavior management technology in pediatric dentistry: a behavioral science perspective. *Pediatr Dent* 16: 13 – 17, 1994.
13. Pinkham JR. Personality development. Managing behavior of the cooperative pre-school child. *Dent Clin N Am* 39: 771-787, 1995.
14. Milgrom P, Weinstein P. Dental fears in general practice: new guidelines for assessment and treatment. *Int Dent J* 43: 288-293, 1993.
15. Melamed BG, Bennett CG, Jerrell G, Ross SI, Bush JP, Hill C et al. Dentists' behavioral management as it affects compliance and fear in pediatric patients. *JADA* 106: 324-330, 1983.
16. McDonald RE. Behavior guidance in the dental office. In: *Dentistry for the child and adolescent*. St. Louis, C.V. Mosby Company, pp 26-37, 1974.
17. Greenbaum PE, Lumley M.A, Turner C, Melamed BG. Dentist's reassuring touch: effects on children's behavior. *Pediatr Dent* 15: 20-24, 1993.
18. Sussman NM, Rosenfeld HM. Touch, justification violations. *J Soc Psychol* 106: 215 –225, 1978.
19. Raadal M, Milgrom P, Weinstein P, Mancl L, Cauce AM. The prevalence of dental anxiety in children from low income families and its relationship to personality traits. *J Dent Res* 74: 439, 1995.
20. Murray JJ, Niven N. The child as a dental patient. *Curr Opi Dent* 2: 59 – 65, 1992.
21. Weinstein P, Getz T, Ratener P, Domoto P. The effect of dentists behavior on fear related behaviors in children. *JADA* 104: 32-38, 1982.
22. Melamed BG, Bennet CG, Jerell G et al. Dentist's behavior management as it affects compliance and fear in paediatric patients. *JADA* 106: 324-330, 1983.
23. Thom A, Sartory G, Jhren P. Comparison between one session psychological treatment and bengodiazepire in dental phobia. *J Consulting Clin Psychol* 68:378-387, 2000.
24. Aartman IH, de Jongh A, Makkes PC, Hoogstraten J. Treatment modalities in a dental fear clinic and the relation with general psychopathology and oral health variables. *Brit Dent J* 186: 467-471, 1999.
25. Folayan MO, Otoyemi OD. Reliability and validity of a short form of the dental subscale of the child fear survey schedule used in a Nigerian children population. *Nigerian J Med* 11:161-163, 2002.
26. Alwin N, Murray JJ, Niven N. The effect of children's dental anxiety on the behaviour of a dentist. *Internat J Peadiatr Dent* 4: 19-24, 1994.
27. Prins PJM, Veerkamp JSF, ter Holst G et al. behaviour of dentist and child patient during treatment. *Community Dent Oral Epidemiology* 15: 253-257, 1987.
28. ten Berge M, Veerkamp P, Hoogstraten J. Dentist's behaviour in response to child dental fear. *J Dent Child* 107: 36-40, 1999.
29. Klingberg G, Berggen U, Carlsson SG, Noren JG. Child dental fear: cause-related factors and clinical effects. *Euro J Oral Sciences* 103: 405-413, 1995.
30. Barton DH, Hatcher E, Potter R, Handsom HZ. Dental attitudes and memories: a study of the effect of hand over mouth/restraint. *Pediatr Dent* 15:13-19, 1993.
31. Murray JJ and Niven N. The child as a dental patient. *Current Opinion in Dentistry* 2: 59-65, 1992.
32. Robert JF. How important are techniques? The empathetic approach to working with children. *J Dent Child* 62: 38-43, 1995.
33. Tay K-M, Winn M, Milgrom P, Hann J, Smith J, Weinstein P. The effect of instruction on dentists' motivation to manage fearful patients. *J Dent Res* 57: 444-448, 1993.

