Comparison between Positive Dental Images and Neutral Images in Managing Anticipatory Anxiety of Children

Dalia O Kamel*/ Nadia A Wahba**/ Dalia M Talaat***

Objective: *To evaluate the impact of positive images versus neutral images on child behavior during dental treatment and their dental anxiety after dental treatment.* ***Study design:*** *Sixty, 4 to 6 year old healthy pediatric dental patients, indicated for pulpotomy and stainless steel crown restorations, were divided randomly into two equal groups. Group I (experimental group viewed positive dental images and group II (control group) viewed neutral cartoon images prior to treatment. Behavior was assessed using Frankl rating scale in all four treatment phases: seating, local anesthesia administration, pulpotomy and overall rating. Patient's anxiety was determined according to Venham Picture Test (VPT) before and after dental procedure.* ***Results:*** *Behavior rating using the Frankl scale showed a statistically significant difference in the two groups in the overall rating (P= 0.003, 0.001 respectively). No statistically significant difference was found between both groups in any of the treatment phases (P= 0.288, 0.060, 0.719 respectively) and between the mean VPT scores before and after procedures (P=0.95, 0.93 respectively.* ***Conclusion:*** *Viewing neutral or positive dental images did not have an effect on child's anticipatory anxiety level. However, it is an effective method of improving the behavior in children.*

Keywords: *Frankl rating scale, Venham Picture Test, images*

INTRODUCTION

The terms "anticipatory anxiety" and "anxiety" are often used to denote an unspecific feeling of apprehension requiring no prior experience of the anticipated situation.[1] The response of a child patient to dental treatment is complex and its etiology is still not entirely understood. [2] Rachman's theory of fear acquisition has shown that children may develop an anxious response directly (by direct treatment) or indirectly through modeling or information from others.[3] All current behavior management techniques applied during the clinical encounter, aim to decrease resistant disruptive behavior, facilitate dental treatment, reduce the level of child dental anxiety, assist the child to cope with dental treatment and enable the passive child to accept dental treatment.[4,5] The American Academy of Pediatric Dentistry (AAPD) [2] outlined basic behavior guidance techniques (tell-show-do, voice control, positive reinforcement, distraction, nonverbal communication, parental presence/absence) and advanced behavior guidance techniques (protective stabilization, nitrous oxide/oxygen inhalation and general anesthesia). Three other techniques were added: (i) contingent distraction where children's disruptive behavior can be reduced by making access to a distractor as videotaped cartoons contingent on cooperative behavior; (ii) modeling through watching peers or children of same age undergo same procedure and (iii) contingent escape by giving the child a brief period (5 sec) of escape from ongoing procedure contingent on cooperative behavior.[6,7] Most of the above approaches have been recommended where anxiety would interfere with treatment.[8] Information can be gathered by observation and interacting with the child and by questioning the child's parents. Achievement of these objectives relies on mastering behavior management techniques, communication and education. [9,10] Studies using the Rachman's theory of fear acquisition [3,11] have shown that children may develop an anxious response directly or indirectly. Recently, some evidence exists on the effect of observing models in management of anxiety in pediatric dental patients.[12,13] This focuses on the principles of social learning, [14] and suggests that exposure to positive images will trigger the learning of an association between the positive images and dentistry. [15,16] The present study aimed to evaluate the impact of positive images versus neutral images on child behavior during dental treatment and their dental anxiety after dental treatment.

*Dalia O Kamel, BDS, MSc, Pediatric Dentist, Alexandria Dental Research Center, Alexandria, Egypt.
** Nadia A Wahba, Professor of Pediatric Dentistry, Pediatric Dentistry and Dental Public Health Department, Faculty of Dentistry, Alexandria University, Alexandria, Egypt.
*** Dalia M Talaat, Lecturer of Pediatric Dentistry, Pediatric Dentistry and Dental Public Health Department, Faculty of Dentistry, Alexandria University, Alexandria, Egypt.

Send all correspondence to:
Nadia A Wahba
Faculty of Dentistry, Alexandria University, Champillion St. Azarita, Alexandria, Egypt.
Phone: +201228400050
Fax: +203-4871328
E-mail: drnadiawahba@gmail.com

Downloaded from http://meridian.allenpress.com/jcpd/article-pdf/41/2/116/1744706/1053-4628-41_2_116.pdf by Bharati Vidyapeeth Dental College & Hospital user on 25 June 2022

MATERIAL AND METHOD

This study was planned as a controlled clinical trial. The study included sixty, 4-6 year old normal healthy children with no previous dental experience Children were selected from the out patients attending the Pediatric Dental Clinic, Pediatric and Community Dentistry Department, Faculty of Dentistry, Alexandria University, **a**fter receiving the approval of the Research Ethics Committee. Children were randomly divided into two groups of 30 patients each. . A sample of 20 per group was required to achieve a difference of 3.1 score at Venham Picture Test (VPT) between experimental and control groups with SD=0.42 and 2.58 power 90% and α=5%. The sample was increased to 30 per group to avoid the non-response effect[16]. **Group I** (experimental group): exposed to positive images of dental treatment and **Group II** (control group): exposed to neutral cartoon images. Children presenting on Saturdays and Mondays were assigned to group I, while those presenting on Tuesdays and Thursdays were assigned to group II. Images depicting pleasant dental treatment of young children in a clinic and others representing non-dental cartoon characters were selected from the internet appropriate for the age group. These were graded on a 10 cm visual analogue scale [17] by the staff members of the Pediatric and Community Dentistry Department. The top ten highest scored images in each of dental and neutral images were included. Parents were informed on the aim of the study and their consents were received. Ten positive images were shown to children in group I and ten neutral cartoon images were shown to children in group II, for 10-15 min, while waiting for treatment. Pre-treatment anticipatory anxiety was scored using VPT [18] for all children. The patients were invited for a tour in the clinic prior to treatment. Dental procedures were performed by the same operator for all patients in the study samples. They were standardized; topical then local anesthesia were administrated, and a mouth prop was used for mouth opening if needed. Rubber dam was applied and pulpotomy followed by stainless steel crown was performed. The length of each appointment ranged from 30 to 45 minutes. All sessions were scheduled in the morning hours. Child behavior was rated using Frankl behavior rating scale [19] during seating in the dental chair, administration of the local anesthesia, treatment process and the overall rating of the procedure was calculated. Dental anxiety was calculated using VPT for both groups after termination of treatment. VPT scores recorded for patient anxiety level were further categorized as Good (non-anxious) if the patient's score ranged from 0-4 and Poor (anxious) if he scored from 4-8 to facilitate the statistical calculations. Likewise in Frankl rating scale, a child was rated positive if he had a positive or definitely positive rating on at least half of the measurement occasions, and negative if he had a negative or definitely negative rating on at least half of the measurement occasions.

RESULTS

In the present study, age and gender sample distribution were comparable in both experimental and control groups this was to facilitate the comparison between the study samples. When comparing child behavior in groups I and II during treatment procedures, no statistically significant difference was found between both groups neither in each category (P= 0.288, 0.060, 0.719 respectively), nor in the overall rating of the procedure

Table 1: Child Behavior (measured by Frankl's scale) in the experimental and control groups.

	Group				*MCP*
	Experimental		Control		
	No	%	No	%	
Seating in dental chair					
Definitely negative	0	0.0	1	3.3	
Negative	1	3.3	4	13.3	0.288
Positive	13	43.3	14	46.7	
Definitely positive	16	53.4	11	36.7	
Administration of local anesthesia					
Definitely negative	1	3.3	2	6.7	
Negative	8	26.7	5	16.7	0.060
Positive	11	36.7	20	66.6	
Definitely positive	10	33.3	3	10.0	
The treatment procedure					
Definitely negative	1	3.3	2	6.7	
Negative	5	16.7	3	10.0	0.719
Positive	11	36.7	9	30.0	
Definitely positive	13	43.3	16	53.3	
Overall rating of the procedure					
Definitely negative	0	0.0	2	6.7	
Negative	5	16.7	2	6.7	0.235
Positive	11	36.7	15	50.0	
Definitely positive	14	46.6	11	36.6	
X^2 (P)	13.4 (0.003)*		17.5(0.001)*		

X2:friedman test for related samples * P < 0.05 (significant)

MCP: P value based on Mont Carlo exact probability.

Table 2: Dental anxiety scores measured by VPT group I and II before and after procedure.

	Group		Z^{mw}	P
	Experimental	Control		
Before procedures				
Mean	2.4	2.2	0.22	0.83
SD	2.1	1.7		
Median	2.0	2.5		
After procedures				
Mean	2.4	2.2	0.45	0.66
SD	2.0	2.1		
Median	3.0	2.0		
Z^{w}(P)	0.06 (0.954)	0.09 (0.929)		

Z^{mw}: Mann-Whitney test for two independent groups

Z^{w} Wilcoxon test for two related groups

Downloaded from http://meridian.allenpress.com/jcpd/article-pdf/41/2/116/1744706/1053-4628-41_2_116.pdf by Bharati Vidyapeeth Dental College & Hospital user on 25 June 2022

(p=0.235). On the other hand, a statistically significant difference was found in the overall child behavior in each group (P= 0.003, 0.001 respectively) (Table1). No statistically significant difference was recorded between the mean VPT scores before and after the procedures neither in group I (P=0.95) nor group II (P= 0.93). Similarly no statistically significant difference was found between the two groups before and after the dental procedure (P= 0.83, 0.66) respectively (Table 2). The relationship between Frankl scale and VPT score is depicted in tables 3 & 4. No significant difference was detected between the two scales. (Table 3,4)

Table 3: Relation between Frankl behavior rating scale and VPT before dental procedure in Group I and II.

Group	Overall rating Frankl Score before dental procedure	Venham before dental procedure				*MCP*
		Good		Poor		
		No	%	No	%	
Group I (experimental)	Negative	1	100	0	0.0	0.735
	Positive	26	92.0	3	10.3	
Group II (control)	Negative	5	100	0	0.0	—
	Positive	25	100	0	0.0	

MCP: P value based on Mont Carlo exact probability.

Table 4: Relation between Frankl behavior rating scale and VPT after dental procedure in Group I and II.

Group	Overall rating Frankl Score after dental procedure	Venham after dental procedure				*MCP*
		Good		Poor		
		No	%	No	%	
Group I (experimental)	Negative	5	100	0	0.0	0.513
	Positive	23	92.0	2	8.0	
Group II (control)	Negative	4	100	0	0.0	0.690
	Positive	25	96.2	1	3.8	

MCP: P value based on Mont Carlo exact probability

DISCUSSION

Dental anxiety is one of the reasons why children refuse visiting the dentist.[20]The impact of first dental visit can influence all future reactions and behavior to dentistry. [10] The dentist should include an evaluation of the child's co-operative potential as part of treatment planning. [21] It has been agreed that anxiety is a personality trait, with different origins.[17] Therefore no single assessment method or tool is completely accurate in predicting a child's behavior for dental treatment. Awareness of the multiple influences on behavior may aid in treatment planning. The present study evaluated the impact of positive images versus neutral images on child behavior during dental treatment and their dental anxiety after the treatment. It was conducted on healthy children with the age range of 4-6 years, which represents the preschoolers who are most commonly prone to maladapted behavior in anxiety provoking situations. This group of children seems to be more aware of new situations than younger children and reveal poorer level of adjustment than older ones so it would be expected that they exhibit negative behavior. [17] All children were chosen with no past dental history, as negative dental experiences may lead to dental anxiety/fear.[22] Wright et al. [23] and Freeman. [24] pointed to the importance of the child's initial dental experience, where more aversive procedures experienced less positive behavior. Similar results were reported by Howard and Freeman. [25] On the other hand, Agarwal and Das. [10] concluded that previous dental experience was not a significant variable for dental anxiety level in school children on total VPT scores. Children were selected among those attending the Pediatric Dental Clinic, Pediatric Dentistry and Dental Public Health Department, Faculty of Dentistry, Alexandria University as it serves as a referral center for patients from all city districts and the surrounding areas, and for the standardization of the treatment protocol adopted by the department. All patients recruited had no physical or mental disability to ensure proper comprehension and completion of the self-reporting scale.[15]Children's anxiety was reduced by encouraging them to explore the dental clinic, where treatment procedures offered to other patients would help in desensitization. TSD technique and positive reinforcement in the form of verbal praise were continuously used. Both techniques allowed successful dental treatment and reduction of fear as mentioned by Klaasen *et al* [26] who evaluated the extent of general and treatment variables in changing children's dental fear. Their findings supported the theoretical framework of conditioning and gradual exposure in children to prevent dental fear. It was chosen that the same dental procedure be applied to all participants to ensure standardization of anxiety reduction. In the present study, there was no statistically significant difference between the two studied groups during seating in the dental chair, administering anesthesia or during the treatment procedure according to Frankl behavior rating scale. By calculating the overall rating of the dental procedure, both groups showed statistically significant behavior change. This was in accordance with Peretz and Gluck [27] who found significant behavioral changes in children participating in the magic book experience where child's attention has been drawn away from the dental situation. The administration of local anesthesia was considered to be the most critical phase that affected the child's cooperation during treatment in both groups. This was in accordance with Pinkham [28] who stated that ninety percent of child dental fear was due to the needle prick associated with local anesthesia. Again, Paryab and Hosseinbor [20] found that peak child anxiety was during the injection phase.

Regarding the anticipatory anxiety of patients in the present study sample, the mean VPT scores in both groups were comparable before and after dental procedures. These findings were in agreement with Ramos-Jorge et al. [29] and Folyan and Idehen [15] who found that the effect of positive dental images did not differ from neutral images in reducing anxiety as measured by VPT scores. However, Ramos-Jorge et al. [29] stressed on the fact that both types of images reduced children's anxiety. On the other hand, our results were in conflict with those of Fox and Newton. [16] who found a significant difference in anxiety between those who viewed positive dental images and those who viewed neutral images. This difference might be attributed to the nature of treatment offered and the wider age range adopted by Fox and Newton[16].

It was observed in the present study that there was no constant relationship between Frankl behavioral scale and VPT. Although

Downloaded from http://meridian.allenpress.com/jcpd/article-pdf/41/2/116/1744706/1053-4628-41_2_116.pdf by Bharati Vidyapeeth Dental College & Hospital user on 25 June 2022

most of the children who were not anxious, behaved properly on the dental chair, some of them behaved negatively during dental procedure. On the contrary, others behaved properly on the dental chair despite their anxiety. Nevertheless, no significant relation was found between the scores of the two scales in both groups. This is inconsistent with Folyan and Idehen [15] who found a weak correlation, while Gustafsson *et al* [30] and Salem *et al*. [31] found a significant correlation between dental anxiety and uncooperative behavior.

Based on the results of the present study, it could be postulated that dental anxiety *per se* is not enough to explain behavior problems among children.

CONCLUSION

Viewing positive or neutral dental images did not have an effect on child's anticipatory anxiety level. However, showing either type of images has been found to be an effective method of improving behavior in children.

REFERENCES

1. Alwin NP, Murray JJ, Britton PG. An assessment of dental anxiety in children. Br Dent J 171(7):201-7, 1991.
2. American Academy of Pediatric Dentistry. Guideline on behavior guidance for the pediatric dental patient. Pediatr Dent 35(6): 175-187, 2014.
3. Rachman S. The conditioning theory of fear acquisition: a critical examination. Behav Res Ther 15: 375–87, 1977.
4. Themessl-Huber M, Freeman R, Humphris G, MacGillivray S, Terzi N. Empirical evidence of the relationship between parental and child dental fear: a structured review and meta-analysis. Int J Paediatr Dent 20(2):83-101, 2010.
5. Howard KE, Freeman R. An evaluation of the PALS after treatment modelling intervention to reduce dental anxiety in child dental patients. Int J Paediatr Dent 19(4):233-42, 2009.
6. Ingersoll BD, Nash DA, Blount RL, Gamber C: Distraction and contingent reinforcement with pediatric dental patients. ASDC J Dent Child 51: 203-7,1984.
7. Allen KD, Stokes TF: Use of escape and reward in the management of young children during dental treatment. J Appl Behav Anal 20: 381-90, 1987.
8. -Kuhn BR, Allen KD. Expanding child behavior management technology in pediatric dentistry: a behavioral science perspective. Pediatr Dent 16(1):13-7, 1994.
9. Peretz B, Nazarian Y, Bimstein E. Dental anxiety in a students' paediatric dental clinic: children, parents and students. Int J Paediatr Dent 14(3): 192-8, 2004
10. Agarwal M, Das UM. Dental anxiety prediction using Venham Picture test: preliminary cross-sectional study. J Indian Soc Pedod Prev Dent 31(1): 22-4, 2013,
11. Rachman SJ. Neo-conditioning and the classic theory of fear acquisition. Clinical Psychology Review 11:155–73, 1991.
12. Wilson S, Cody WE. An analysis of behavior management papers published in the pediatric dental literature. Pediatr Dent 27(4):331-8, 2005.
13. Adair SM. Behavior management conference panel I report—Rationale for behavior management techniques in pediatric dentistry. Pediatr Dent 26(2):167-70, 2004.
14. Regehr G, Rajaratanam K. Models of learning: implications for teaching students and residents. Lessons learned for the 21st century. Mahwah, NJ: Lawrence Erlbaum Associates Inc. 51–5, 2000.
15. Folayan MO, Idehen EE. Effect of information on dental anxiety and behavior ratings in children. Eur J Paediatr Dent 5(3):147-50, 2004.
16. Fox C, Newton JT. A controlled trial of the impact of exposure to positive images of dentistry on anticipatory dental fear in children. Community Dent Oral Epidemiol 34(6):455-9, 2006.
17. Wright GZ. Behavior management in dentistry for children. Toronto: W.B. Saunders Co., 1975.
18. Venham LL, Gaulin-Kremer E. A self-report measure of situational anxiety for young children. Pediatr Dent 1(2):91-6, 1979.
19. Frankl SN, Shiere FR, Fogels HR. Should the parent remain with the child in the dental operatory? J Dent Child 29:150–63, 1962.
20. Paryab M, Hosseinbor M. Dental anxiety and behavioral problems: a study of prevalence and related factors among a group of Iranian children aged 6-12. J Indian Soc Pedod Prev Dent 31(2): 82-6, 2013.
21. Law CS, Blain S. Approaching the pediatric dental patient: A review of nonpharmacologic behavior management strategies. J Calif Dent Assoc 31(9): 703-13, 2003.
22. Klingberg G, Broberg AG. Dental fear/anxiety and dental behavior management problems in children and adolescents a review of prevalence and concomitant psychological factors. Int J Paediatr Dent 17(6): 391-406, 2007.
23. Wright GZ, Starkey PE, Gardner DE. Child management in dentistry. 2nd ed. Bristol: IOP Publishing limited 76-85, 1987.
24. Freeman R. A fearful child attends: a psychoanalytic explanation of children's responses to dental treatment. Int J Paediatr Dent 17(6): 407-18, 2007.
25. Howard KE, Freeman R. An evaluation of the PALS after treatment modelling intervention to reduce dental anxiety in child dental patients. Int J Paediatr Dent 19(4): 233-42, 2009.
26. Klaassen MA, Veerkamp JS, Hoogstraten J. Changes in children's dental fear: a longitudinal study. Eur Arch Paediatr Dent 9(1): 29-35, 2008.
27. Peretz B, Gluck G. Magic trick. A behavioral strategy for the management of strong-willed children. Int J Paediatr Dent 15(6): 429-36, 2005.
28. Pinkham JR. Patient management. In: Pinkham JR, Casamassimo PS, McTigue DJ, Fields HW, Nowak AJ (eds). Pediatric dentistry: infancy through adolescence. 4th ed. Missouri: Elsevier, Saunders Co 394-413, 2005.
29. Ramos-Jorge ML, Ramos-Jorge J, Vieira de Andrade RG, Marques LS. Impact of exposure to positive images on dental anxiety among children: a controlled trial. Eur Arch Paediatr Dent 12(4): 195-9, 2011.
30. Gustafsson A, Broberg A, Bodin L, Berggren U, Arnrup K. Dental behavior management problems: the role of child personal characteristics. Int J Paediatr Dent 20(4): 242-53, 2010.
31. Salem K, Kousha M, Anissian A, Shahabi A. Dental fear and concomitant factors in 3-6 year-old children. J Dent Res Dent Clin Dent Prospect 6(2): 70-4, 2012.

Downloaded from http://meridian.allenpress.com/jcpd/article-pdf/41/2/116/1744706/1053-4628-41_2_116.pdf by Bharati Vidyapeeth Dental College & Hospital user on 25 June 2022