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COVER STORY

Predicting successful dental examinations for children with autism spectrum disorder in the context of a dental desensitization program

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Autism spectrum disorder (ASD) is 1 of the most common developmental disorders diagnosed worldwide. According to the Centers for Disease Control and Prevention, ASD occurs in 1 of 68 children but is not related to ethnicity, nationality, or socioeconomic status. It is approximately 5 times more common in boys than girls.[1]

BARRIERS TO DENTAL CARE

Although a high percentage of children with ASD have visited a dentist (97%), many do not receive the level of care necessary to maintain good oral health.[2] The prevalence of unmet dental need in children with ASD is 12% to 15% compared with approximately 5% of typically developing children.[2-5]

By definition, children with ASD have impairment in communication and sensory

ABSTRACT

Background. The authors evaluated the effectiveness of a dental desensitization program for children with autism spectrum disorder (ASD) and determined characteristics associated with a successful dental examination.

Methods. The authors performed a retrospective review of clinical behavioral data and previsit questionnaires for 168 children with ASD who attended a university-based dental desensitization program. Data elements included demographic, treatment, and behavioral characteristics. The primary outcome was receiving a minimal threshold examination (MTE) while seated in a dental chair.

Results. An MTE was achieved for 77.4% of all children within 1 to 2 visits and 87.5% in 5 visits or less. Several factors predicted a successful dental examination: ability to be involved in group activities (relative risk [RR], 1.18; $P = .02$), ability to communicate verbally (RR, 1.17; $P < .01$), understanding of most language (RR, 1.14; $P = .02$), moderate versus severe caregiver-rated ASD severity (RR, 1.24; $P = .04$), and ability to dress self (RR, 1.27; $P = .04$).

Conclusions. Desensitization was effective in achieving an MTE for most children. Those with characteristics consistent of a milder presentation of ASD were more likely to be successful.

Practical Implications. Desensitization can be a successful approach to providing dental care for children with ASD.

Key Words. Autistic disorder; oral health; pediatric dentistry; special-care dentistry.
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modulation. Therefore, basic behavior guidance techniques (BGTs) such as tell-show-do, positive reinforcement, distraction, and voice control that are effective with typically developing children may not be as effective with this population.[6-8] Circumstances that overwhelm the child's senses can also lead to avoidance reactions that may escalate to physical aggressiveness.[2,9,10] Consequently, parents may be reluctant to seek treatment, and dentists frequently resort to advanced BGTs such as protective stabilization, procedural sedation, and general anesthesia to facilitate dental care.[7,8,11]

Supplemental material is available online.

EDUCATIONAL AND BEHAVIORAL APPROACHES TO CARE

Contemporary dental behavior-management strategies have begun including approaches that are used in educational settings.[6,11,12] Providers using these strategies recognize that the ability to receive dental care is a life skill that may be learned over time. Treatment protocols include standard techniques such as visual preparation aids[13-15]; applied behavior analysis[6]; a developmental, individual-differences, and relationship-based approach[13]; treatment and education of children with autism and related communication handicaps[16]; individualized reinforcement[17,18]; and sensory-adapted dental environments.[19]

Another approach for providing dental care for children and adults with intellectual disabilities combines progressive desensitization with individualized reinforcement.[19-22] In this type of program, the patient is gradually exposed to aspects of the dental visit that produce anxiety and provided with positive reinforcement through individualized rewards.[23] Treatment programs that use desensitization and exposure approaches have shown promise, but researchers investigating these approaches have varied widely in design.[14,15,18,24]

PREDICTORS OF A SUCCESSFUL EXAMINATION

Variables such as older age,[7,11,20] higher cognitive functioning,[7,20,25] greater communication skills (verbal ability, reading skills),[7,20] and increased ability to perform self-care[7] have been positively associated with compliance for a dental examination in children with ASD. In contrast, a high level of challenging behaviors,[20] sensory over-responsivity,[26] comorbid medical conditions,[7] and residence in a group home have been associated with poorer acceptance of dental procedures.[27,28] To date, few researchers have described cooperation predictors for children with ASD in detail or evaluated these characteristics in the context of a dental desensitization program.

The primary purpose of our study was to evaluate the effectiveness of a dental desensitization program for children with ASD. We hypothesized that children who are young, have a comorbid medical diagnosis, have parent-rated severe autism, are nonverbal, and have limited self-care abilities would be less likely to benefit from dental desensitization than their more mildly affected peers. The specific aims of our project were to evaluate the effectiveness of a dental desensitization program for children with ASD and determine the association between a child's age, medical diagnosis, parent-rated severity, communication ability, and self-care skills and his or her ability to tolerate a minimal threshold examination (MTE).

METHODS

Study design and sample. We organized a retrospective cohort study. The sample was composed of patients who participated in a dental desensitization program for children with ASD at the Center for Pediatric Dentistry at the University of Washington in Seattle, WA, from January 2012 through January 2015. Criteria for inclusion were ASD diagnosis by a physician, aged 4-18 years, and completed a previsit questionnaire. Children in the pre-cooperative age group (0-3 years), those with incomplete chart entries or previsit intake forms, and those with non–English-speaking caregivers who were unable to complete the intake form were excluded from the study.

We used data from a comprehensive previsit information intake form completed by the caregiver that asked about previous treatment experiences, behavior, and social and communication skills. We conducted a detailed chart abstraction of each clinical visit to quantify the child's ability to tolerate an MTE—defined as an examination with an intraoral mirror while seated in a dental chair—and the number of desensitization visits required before a child was able to tolerate an MTE. We used this as a minimal threshold for a dental examination to accurately identify the point when a standardized examination procedure was obtained. This definition of MTE stands in contrast to examination procedures that are sometimes adopted when patient cooperation is suboptimal (for example, an examination with the patient standing in the corner of a room, using a penlight while the patient is seated in a nondental chair, and using fingers or a toothbrush instead of a dental mirror). The University of Washington Institutional Review Board approved this study for human participants (Human Subjects Division #49134).

Variables. *Predictors.* We classified the primary independent variables of interest as treatment variables and behavioral variables. Treatment variables included history of therapy (any therapy, including speech, occupational, complementary and alternative medicine, behavioral, and physical), number of therapies received, and history of protective stabilization, sedation, or

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ABBREVIATION KEY. ASD: Autism spectrum disorder. **BGT:** Behavior guidance technique. **MTE:** Minimal threshold examination.

anesthesia for dental care. Behavioral variables included caregiver-rated ASD severity, level of challenging behaviors, social abilities (cooperate during simple activities, be involved in group activities, engage in shared activities, play with friends, have friends), communication skills (verbal, understand language, follow 1-step directions, mimic, communicate with written words, use sign language), and self-care skills (dress by self, use toilet by self, bathe by self, brush own teeth, brush own hair).

Outcomes. The primary outcome variable of interest in this study was the patient's ability to receive an MTE. The secondary variable of interest was the number of dental visits required to achieve an MTE.

Other variables. Other variables of interest included age, sex, race, insurance status (public, private, or none), comorbid medical conditions (sensory sensitivities, anxiety, sleep disorder, gastrointestinal problems, and seizures), and living environment.

Collection and analyses of data. *Caregiver questionnaire.* Per clinic protocol, before the initial clinical visit, we mailed a 34-item questionnaire to the family, who returned it to the clinic (Appendix, available online at the end of this article). We used a 5-point Likert scale (1 being completely unable and 5 being able without difficulty) to assess the child's behavioral characteristics, self-care abilities, and communication skills. We asked caregivers to rate their child's behavioral characteristics for each of 6 social skills as "not able," "infrequently able," "sometimes able," "frequently able," or "able all the time." To assess the child's self-care and communication abilities, we asked parents to submit responses in similar multipoint Likert scale format. We extrapolated numerical ratings within each category to binary categories of "able" or "unable." For example, for the behavioral variable "communication," we considered the child "able" if the parent responded always or most of the time. We considered the child "unable" if the parent responded sometimes, not much, or never.

Clinical procedures. A single pediatric dentistry attending faculty member (T.N.) or pediatric dentistry residents under the supervision of the same attending faculty member treated all participants. Desensitization program fundamentals included administration of a previsit questionnaire, initial clinical behavioral assessment, development of an individualized care plan, use of a social story, and repeated clinical visits as necessary to achieve clinical goals. Individualized care plans included goal setting and previsit preparation in the home. At each visit, we incorporated tailored BGTs such as voice control and individualized positive reinforcement into the dental desensitization program, with successive approximation to the treatment goal. Details of the program framework are described elsewhere.[13]

TABLE 1

Behavioral rating system.

LIKERT SCALE	DESCRIPTION	CORRESPONDING FRANKL SCORE*	WHAT IT MEANS
1	Completely unable	−/−	Uncooperative
2	Able with extreme difficulty	−	
3	Able with moderate difficulty	+	Cooperative
4	Able with minimal difficulty	+/+	
5	Able without difficulty	+/+	

* Scores are as follows: −/−, definitely negative; −, negative; +, positive; +/+ definitely positive.

Beginning with the first desensitization visit, the dentist who performed the care rated the child behavior on the Likert scale. We trained providers to record detailed behavioral information in the electronic chart. If data were missing, 2 independent raters (T.N., A.C.) reviewed the treatment note, and they reached consensus on the behavioral score.

We extrapolated numerical behavior scores for each visit to the Frankl behavior scale, a behavior rating system that separates patient behaviors into 4 categories ranging from definitely positive to definitely negative.[29] We considered a positive or definitely positive Frankl score "cooperative" and a negative or definitely negative Frankl score "uncooperative." We coded behavior as uncooperative if the treatment goal was not achieved through voluntary cooperation or if protective stabilization was used to achieve the treatment goal (Table 1).

Chart abstraction. We conducted a detailed review of treatment notes for all clinical visits for each child. We recorded the total number of clinical visits for each patient and the number of clinical visits with a behavioral score of 3 (able with moderate difficulty) or greater for sitting in a dental chair and receiving a dental examination with a mouth mirror. When the child achieved a score of 3 or greater for both tasks, we considered him or her to have achieved an MTE. We documented behavioral failure if the patient was unable to receive an MTE during the study period.

Statistical analysis. We calculated frequencies and percentages for categorical variables including demographics, language, insurance, caregiver-rated ASD severity, history of behavior guidance, and behavioral, communication, self-care, and mood characteristics as well as co-occurring medical conditions. With unadjusted relative risks from modified Poisson regression, we examined the association between the ability to receive an MTE and all variables of interest. We used a 2-tailed statistical significance level of $P < .05$ for all statistical tests.

RESULTS

Sample characteristics. A total of 168 children with ASD were eligible for inclusion during the 36-month study period. The male to female ratio was 4.8:1. Patients were

grouped according to age: 4 through 6 years (42.3%), 7 through 12 years (42.9%), and 13 through 18 years (14.9%) (percentages do not add to 100 due to rounding). Approximately one-half were enrolled in public insurance programs, and one-half had private insurance. Nearly all patients lived with their parents (94.6%). Caregivers reported a wide variety and frequency of comorbid conditions, the most common being sensory sensitivities (47.6%). Most of the children (85%) had visited a dentist in the past, but less than one-quarter of the children in the study had a history of protective stabilization (16.1%), sedation (19.6%), or general anesthesia (23.2%) for dental treatment. We summarize the bivariate associations between demographic and treatment variables and ability to receive an MTE in Table 2.

Caregiver rating of a child's ASD severity ranged considerably, with approximately 23% of the children described as mild, 40% as moderate, and 21% as severe. Most were described as having social abilities such as the ability to engage in shared activity or play with others. In contrast, only 36% of the children were reported as having friends. Only 35% of the children were described as verbal; however, nearly one-half understood language, and most were capable of following 1-step directions. Most children were capable of performing at least some self-care skills such as toileting, dressing, bathing, toothbrushing, and hair brushing. We summarize the behavioral characteristics of participants in Table 3.

Dental desensitization intervention. We obtained an MTE for 77.4% of all children within 1 to 2 visits; 87.5% received an MTE by the fifth visit. It was not possible for us to obtain an MTE for 12.5% of the children (Table 4). For those able to receive an MTE, the total number of clinic visits ranged from 1 to 29, with the mean being 3.5. The patient who attended 29 visits was able to have an examination at visit 8 and continued returning to the clinic for reinforcement visits. The highest number of visits for those unable to receive an MTE was 7 (data not shown).

Factors associated with ability to receive an examination. Over 95% of the children with ASD severity rated as mild to moderate were able to receive an MTE. In comparison, 77% of those who were rated as severe achieved an MTE. When we analyzed mild, moderate, and severe ASD severity statistically, we found that only the relationship between moderate and severe ASD was statistically significant. History of protective stabilization, sedation, or general anesthesia was not associated with ability to receive a dental examination. Other statistically significant factors included ability to be involved in group activities, verbal communication, understanding of language, mimicking or echolalia, and ability to perform the self-care skill of dressing (Table 3).

DISCUSSION
We describe in this study a dental desensitization intervention in a sample of children with ASD. The

purpose was to evaluate the effectiveness of a dental desensitization program for children with ASD and determine factors associated with ability to tolerate an MTE. We hypothesized that children with more severe disability would be less likely to tolerate MTE than more mildly affected children. In a population in which only approximately one-third of patients were described as verbal, most learned to receive an MTE within 5 desensitization visits.

Visits required for successful desensitization. Most patients in the study were able to receive an MTE through participation in the desensitization program. This emphasizes the fact that many children with ASD can benefit from dental desensitization. Not all were successful in this treatment approach. Our findings suggest that it may help explain to families that if the child does not learn to tolerate an examination within 3 to 5 visits, it might be more practical to consider alternative behavior-management approaches. Although the average number of visits to obtain an MTE was 1 to 2, we saw that a number of children continued returning to the clinic for many more visits to reinforce learned skills. Educational and behavioral programs to teach dental skills (skills for being able to receive dental care) should factor in family requests for frequent return visits.

Factors associated with examination success. A wide variety of BGTs have been used to facilitate dental care for children with ASD, but the literature on this topic is inconclusive. Most articles are expert opinions or small studies.[7,8,11,15-21] We attempted to determine factors associated with the ability to undergo an MTE. In previous studies, researchers associated younger age,[7,11,19] female sex,[11] high levels of challenging behaviors,[19] heightened sensory sensitivities,[26] concurrent medical diagnosis,[7,11] and living in a group home[27,28] with a child's inability to cooperate for a dental examination. Contrary to previous findings, we did not find that these factors were associated with treatment failure in our study population. Differences in our study population or treatment approach may have contributed to this discrepancy.

Consistent with the findings from Marshall and colleagues,[7] we found that the related communication skills of verbal ability and understanding language and self-care skill of dressing were associated with a child's ability to cooperate for a dental examination. Although we determined verbal skills to be positively associated with receiving dental care, it is important to note that approximately two-thirds of our sample was described by their caregivers as nonverbal or having limited verbal ability. However, most of the children had the ability to follow 1-step instructions. This indicates that although learning dental skills may be more likely for verbal children, verbal ability should not be a prerequisite for enrollment in a desensitization program. Factors such as compliance in other areas should be considered. In addition, children with social skills such as the ability to

TABLE 2

Demographic and treatment variables for children with autism spectrum disorder.*

VARIABLES	TOTAL (N = 168), NO. (%)	WAS THE CHILD ABLE TO RECEIVE A QUALITY DENTAL EXAMINATION?		UNADJUSTED RELATIVE RISK (95% CONFIDENCE INTERVAL)	P VALUE
		Yes (n = 147), No. (%)	No (n = 21), No. (%)		
Age, y					.11
4-6	71 (42.3)	60 (40.8)	11 (52.4)	0.88 (0.77 to 1.00)	.51
7-12	72 (42.9)	63 (42.9)	9 (42.9)	0.91 (0.81 to 1.03)	.13
13-18	25 (14.9)	24 (16.3)	1 (4.8)	Reference	—†
Sex					.22
Male	139 (82.7)	120 (81.6)	19 (90.5)	Reference	—
Female	29 (17.3)	27 (18.4)	2 (9.5)	1.08 (0.96 to 1.22)	.22
Race					.75
White	85 (50.6)	74 (50.3)	11 (52.4)	Reference	—
Asian	19 (9.5)	16 (10.9)	3 (14.3)	0.97 (0.78 to 1.19)	.76
Black or African American	16 (11.3)	15 (10.2)	1 (4.8)	1.08 (0.93 to 1.25)	.34
Other or multiple	28 (16.7)	25 (17.0)	3 (14.3)	1.03 (0.88 to 1.19)	.75
Unanswered	20 (11.9)	17 (11.6)	3 (14.3)	—	—
Insurance					**< .01‡**
Public	87 (51.8)	77 (52.4)	10 (47.6)	Reference	—
Private	79 (47.0)	68 (46.3)	11 (52.4)	0.97 (0.87 to 1.09)	.64
None	2 (1.2)	2 (1.4)	0 (0.0)	1.13 (1.05 to 1.22)	**< .01**
Lives With					.67
Parents	159 (94.6)	140 (95.2)	19 (90.5)	Reference	—
Other	5 (3.0)	4 (2.7)	1 (4.8)	0.91 (0.58 to 1.42)	—
Unanswered	4 (2.4)	3 (2.0)	1 (4.8)	—	—
Comorbid Medical Condition Variables					
Presence of any sensory sensitivities	80 (47.6)	70 (47.6)	10 (47.6)	1.00 (0.89 to 1.12)	> .99
Presence of anxiety	51 (30.4)	48 (32.7)	3 (14.3)	1.11 (1.00 to 1.23)	**.04**
Presence of sleep disorders	41 (24.4)	34 (23.1)	7 (33.3)	0.93 (0.80 to 1.09)	.36
Presence of gastrointestinal problems	31 (18.5)	24 (16.3)	7 (33.3)	0.86 (0.71 to 1.05)	.14
Presence of seizures	13 (7.7)	11 (7.5)	2 (9.5)	0.96 (0.76 to 1.23)	.77
History of Therapy Variables					
History of any therapy	134 (79.8)	118 (80.3)	16 (76.2)	1.04 (0.87 to 1.24)	.66
History of any speech therapy	125 (74.4)	109 (74.1)	16 (76.2)	1.05 (0.86 to 1.27)	.64
History of any occupational therapy	98 (58.3)	88 (59.9)	10 (47.6)	1.10 (0.93 to 1.30)	.26
History of any complementary and alternative medicine	83 (49.4)	70 (47.6)	13 (61.9)	1.00 (0.86 to 1.16)	.97
History of any behavioral therapy	79 (47.0)	70 (47.6)	9 (42.9)	1.08 (0.93 to 1.26)	.32
History of any physical therapy	38 (22.6)	30 (20.4)	8 (38.1)	0.87 (0.73 to 1.04)	.14
Number of Therapies Child Received					.08
0-1	35 (20.8)	29 (19.7)	6 (28.6)	Reference	—
2-3	59 (35.1)	56 (38.1)	3 (14.3)	1.15 (0.97 to 1.35)	.10
4-5	45 (26.8)	36 (24.5)	9 (42.9)	0.97 (0.78 to 1.19)	.74
6+	21 (12.5)	18 (12.2)	3 (14.3)	1.03 (0.82 to 1.30)	.74
Unknown	8 (4.8)	8 (5.4)	0 (0.0)	—	—
History of Behavior Guidance Variables					
History of any protective stabilization	27 (16.1)	23 (15.6)	4 (19.0)	0.97 (0.81 to 1.15)	.69
History of any sedation	33 (19.6)	28 (19.0)	5 (23.8)	0.96 (0.82 to 1.12)	.60
History of any general anesthesia	39 (23.2)	32 (21.8)	7 (33.3)	0.91 (0.78 to 1.07)	.27

* Percentages may not add to 100 due to rounding.
† Dashes indicate either data not reported (reference category P values) or not applicable.
‡ Bold values indicate statistical significance.

TABLE 3

Behavioral variables for children with autism spectrum disorder.*

VARIABLES	TOTAL (N = 168), NO. (%)	WAS THE CHILD ABLE TO RECEIVE A QUALITY DENTAL EXAMINATION?		UNADJUSTED RELATIVE RISK (95% CONFIDENCE INTERVAL)	P VALUE
		Yes (n = 147), No. (%)	No (n = 21), No. (%)		
Caregiver-Rated Autism Spectrum Disorder Severity					.04[†]
Mild	38 (22.6)	33 (22.4)	5 (23.8)	1.13 (0.90 to 1.40)	.29
Moderate	68 (40.5)	65 (44.2)	3 (14.3)	1.24 (1.03 to 1.50)	**.03**
Severe	35 (20.8)	27 (18.4)	8 (38.1)	Reference	—[‡]
Unknown	27 (16.1)	22 (15.0)	5 (23.8)	—	—
Level of Challenging Behaviors					.90
Low	81 (48.2)	72 (49.0)	9 (42.9)	Reference	—
Moderate	71 (42.3)	62 (42.2)	9 (42.9)	0.98 (0.87 to 1.11)	.77
High	13 (7.7)	11 (7.5)	2 (9.5)	0.95 (0.75 to 1.22)	.69
Unknown	3 (1.8)	2 (1.4)	1 (4.8)	—	—
Social Abilities					
Ability to cooperate during simple activities	144 (85.7)	131 (89.1)	13 (61.9)	1.31 (0.99 to 1.72)	.06
Ability to be involved in group activities	103 (61.3)	96 (65.3)	7 (33.3)	1.18 (1.02 to 1.35)	**.02**
Ability to engage in shared activities	147 (87.5)	131 (89.1)	16 (76.2)	1.11 (0.89 to 1.40)	.35
Ability to play with others	99 (58.9)	91 (61.9)	8 (38.1)	1.12 (0.99 to 1.26)	.08
Ability to have friends	60 (35.7)	55 (37.4)	5 (23.8)	1.07 (0.96 to 1.20)	.21
Communication Skills					
Ability to be verbal	59 (35.1)	57 (38.8)	2 (9.5)	1.17 (1.06 to 1.29)	**< .01**
Ability to understand language	79 (47.0)	74 (50.3)	5 (23.8)	1.14 (1.02 to 1.28)	**.02**
Ability to follow 1-step directions	115 (68.5)	104 (70.7)	11 (52.4)	1.14 (0.98 to 1.34)	.10
Ability to mimic (echolalia)	26 (15.5)	26 (17.7)	0 (0.0)	1.18 (1.10 to 1.26)	**< .01**
Ability to communicate with written words	18 (10.7)	17 (11.6)	1 (4.8)	1.10 (0.96 to 1.25)	.15
Ability to use sign language	4 (2.4)	4 (2.7)	0 (0.0)	—	—
Self-Care Skills					
Ability to dress by self	134 (79.8)	122 (83.0)	12 (57.1)	1.27 (1.01 to 1.58)	**.04**
Ability to use toilet by self	143 (85.1)	129 (87.8)	14 (66.7)	1.25 (0.97 to 1.61)	.08
Ability to bathe by self	105 (62.5)	96 (65.3)	9 (42.9)	1.13 (0.99 to 1.30)	.07
Ability to brush own teeth	99 (58.9)	90 (61.2)	9 (42.9)	1.10 (0.97 to 1.25)	.13
Ability to brush own hair	96 (57.1)	87 (59.2)	9 (42.9)	1.11 (0.97 to 1.27)	.12

* Percentages may not add to 100 due to rounding.
† Bold values indicate statistical significance.
‡ Dashes indicate either data not reported (reference category P values) or not applicable.

TABLE 4

Number of visits required to obtain a quality dental examination, by age.

AGE, Y	1-2, NO. (%)	3-5 NO. (%)	> 5 NO. (%)	UNABLE NO. (%)	TOTAL	P VALUE
4-6	53 (74.6)	4 (5.6)	3 (4.2)	11 (15.5)	71	
7-12	57 (79.2)	5 (6.9)	1 (1.4)	9 (12.5)	72	.429
13-18	20 (80.0)	4 (16.0)	0 (0.0)	1 (4.0)	25	
Total	130 (77.4)	13 (7.7)	4 (2.4)	21 (12.5)	168	

be involved in group activities were more successful in learning to accept dental examinations using the desensitization approach. This is consistent with a study by McKinney and colleagues,[5] who found that children whose ASD interfered with their ability to attend school and participate in organized activities were more likely to have unmet dental needs.

The behavioral profile of a child who is able to receive an MTE appears to be consistent with a milder presentation of autism. However, the results for caregiver-rated severity were not entirely clear. We found that children whose caregivers rated them as having moderate ASD (versus severe ASD) had an increased likelihood of receiving an MTE. This suggests that patients who are described by their caregivers as being severely affected with ASD are less likely to tolerate an examination. Confusingly, moderate ASD severity was positively associated with successfully receiving an examination, but mild ASD severity was not. This may be a reflection

of the subjective nature of caregivers' ratings. Indeed, a number of parents responded "don't know" regarding their child's severity. This is likely an indication that in the absence of a validated scale, many parents are uncertain about their child's severity. It is also possible that the observed effect of the children rated as moderate appears larger due to random variation.

We found in this study indication that desensitization therapy can be effective in teaching children with ASD to receive an MTE and suggestions that children who are able to engage socially with clinicians and caregivers and perform basic self-care are excellent candidates for desensitization therapy. For those patients who are most severely affected by autism, this may not be a viable treatment approach. Advanced BGTs of protective stabilization, sedation, and general anesthesia are appropriate methods for managing their care. Therefore, when developing a dental desensitization program, practitioners should consider using a previsit questionnaire to learn more about the child's ASD severity, participation in behavioral therapy, communication skills, language understanding, social skills, and ability to perform self-care. Parent responses help the clinician better understand the child and may aid in predicting the child's ability to successfully learn dental skills. It is also important to recognize that behavioral research investigating dental care for children with ASD is ongoing. Other techniques such as applied behavior analysis and sensory-adapted dental environment hold considerable promise. Desensitization therapy, therefore, should be considered in the context of other adjunctive and complementary strategies.

We determined that it is possible to teach children with ASD to receive a dental examination through desensitization. This is a critical first step down the pathway to oral health. However, we do not know yet what this means for their ability to receive preventive and restorative dental care. At the very least, patients who learn to tolerate examination procedures are not forced to receive regular dental surveillance through restraint. In addition, adult patients who are strongly resistant to dental examinations present a challenge for care in the community. It is therefore likely that tolerating dental examinations could be considered a life skill that expands the group of providers who are willing to care for these people.

Limitations. In this study, caregivers' subjective reports of child characteristics may have influenced the results. We obtained these baseline data at the beginning of the study, but we did not account for each child's developmental trajectory over the study period. It is likely that, independent of the dental desensitization treatment, some participants simply matured and acquired social skills during the study period. We also did not assess maintenance of learned skills. It will be important for researchers in future studies to assess how well skills are maintained over time and if they are transferrable to other practice locations. Researchers in future studies should also investigate whether the ability to receive an MTE leads to the ability to receive more complex treatment (for example, radiographs, sealants, and restorations). In contrast to studies that have been performed in institutional living facilities, nearly all participants in this project lived at home with their families. Children who reside at home may be less profoundly affected with autism than their peers in institutions. Consequently, our findings may not be generalizable to the overall population of children with ASD.

CONCLUSIONS

The results of this study indicate that desensitization can be an effective method of teaching dental skills to children with ASD. In our sample, most children tolerated a dental examination within 1 to 2 desensitization visits, and most children received an MTE after 5 visits. Children with characteristics indicative of a milder presentation of autism were more likely to benefit from dental desensitization. Greater communication skills, self-care abilities, and social skills were associated with increased likelihood of receiving a dental examination. Similarly, children rated as having moderate ASD severity were more likely to receive an examination than those rated as severe. Researchers in future studies should focus on determining whether dental skills attained through desensitization are maintained over time and how effective desensitization is in teaching patients to accept radiographs, preventive care, and restorative dental treatment. ∎

SUPPLEMENTAL DATA

Supplemental data related to this article can be found at http://dx.doi.org/10.1016/j.adaj.2017.03.015.

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