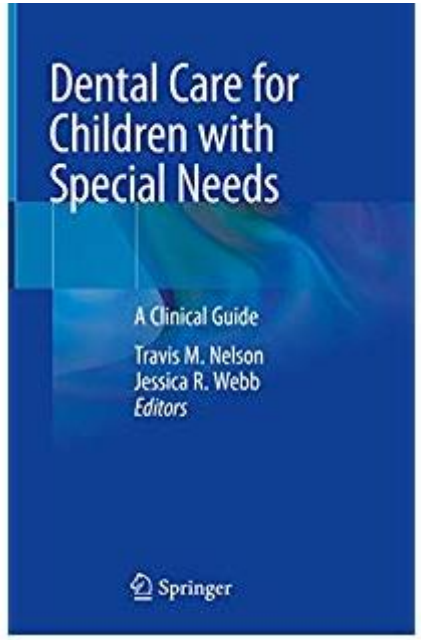
Strategies for Providing Compassionate Dental Care to Children with Special Needs

Travis Nelson DDS, MSD, MPH

Hawaii Dental Association Convention

Outline

- Overview of disability
- Communication with CSHCN
- Oral Hygiene and Prevention
- Pharmacological Management
- Nutritional Considerations
- Desensitization
- Case Studies



What we won't cover: specifics of medically complex care, orthodontic care, protective stabilization, and nonrestorative dental treatment

Special Thanks

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Overview of Disability

Children With Special Healthcare Needs (CSHCN)

"have or are at increased risk for chronic physical, developmental, behavioral or emotional conditions and who also require health and related services of a type or amount beyond that required by children generally"

Children With Special Healthcare Needs

15-20% of US Children under 18 meet this definition

Disability

Impairment: a functional or structural problem that causes a physical, mental, or sensory difference

Disability: impairment and its effect on activity, participation, and opportunity

The interaction between the person's body and the social and physical environment in which that person lives

World Health Organization

Disability

Medical Model

- Impairment is considered first
- Disability ought to be corrected
- Focus is on the disability rather than the person as a whole

Social Model

- Limitations result from negative attitudes, lack of services or support
- Person has an impairment, society disables them

Hughes British *Journal of Healthcare Assistants* 2010; 4: 508-511 Sisti *J Med Ethics* 2015; 41: 553-556
Zalta et al *Stanford Encyclopedia of Philosophy* Disability: Definitions, Models, Experience 2015: 1-30

Health and Disability

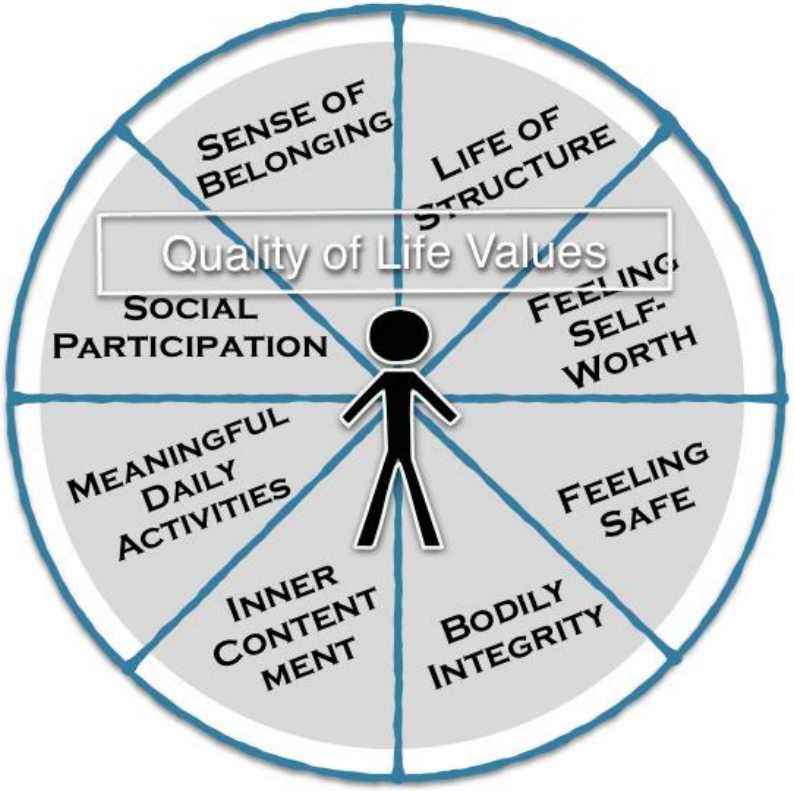
- Historically poor health was considered part of being disabled
- We now recognize that there is a difference between disability and health

Special Olympics

Krahn GL et al *Mental Retardation and Developmental Disabilities Research Reviews* 2006; 12: 70-82.

People with Disabilities

- Rate quality of life MUCH higher than others rate it for them
- Quality of life comparable to non-disabled people
- Do not necessarily view condition as a problem or pathological



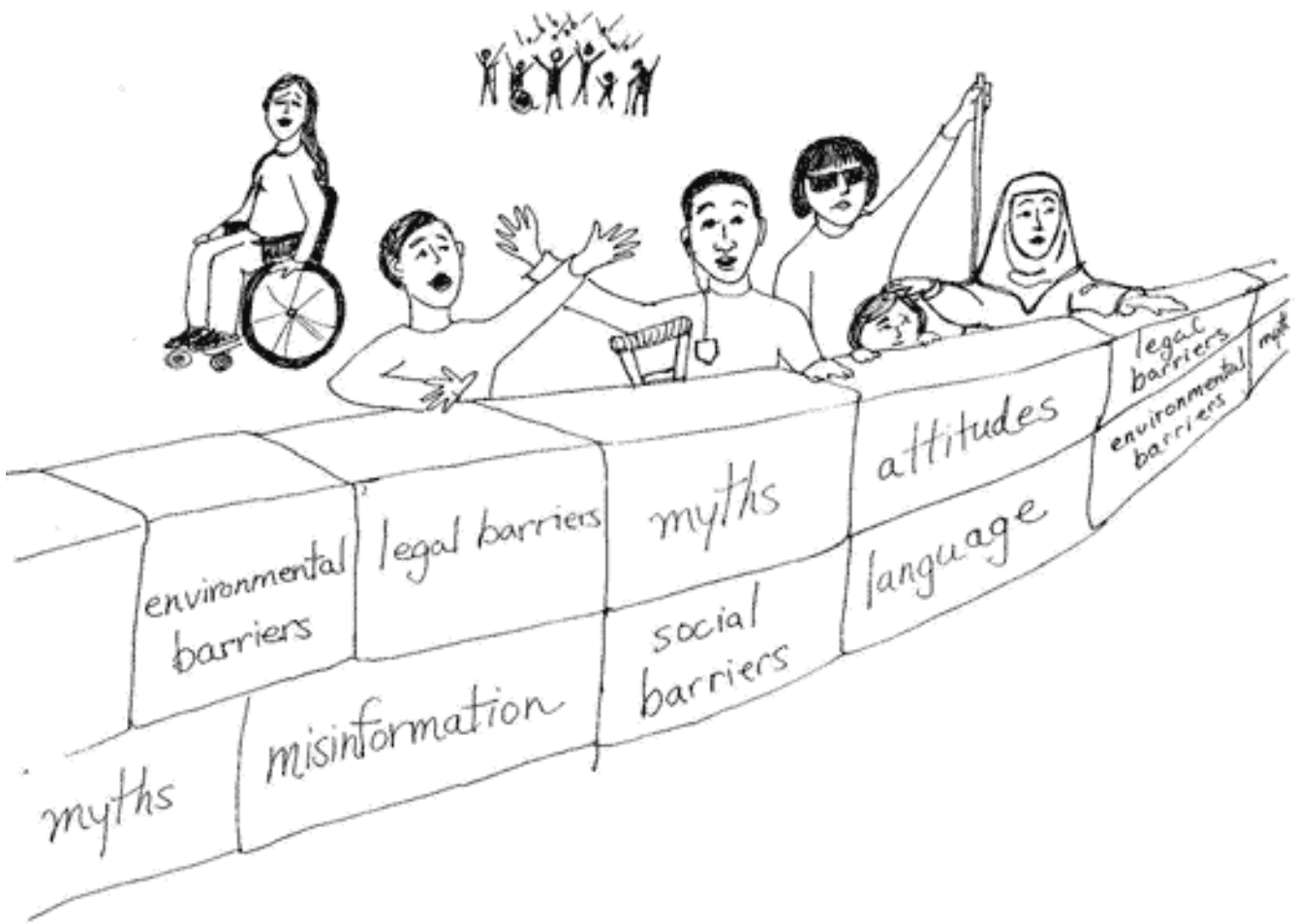
Shakespeare et al *Lancet* 2009; 374: 1815-1816

Implicit Bias

- Explicit bias is conscious
- Implicit bias is automatic
- Allows for efficiency in decision making and processing information
- Physician implicit bias has been shown to affect treatment decisions
- Moderate to strong negative implicit attitude towards people with disabilities

Chapman et al *J Gen Intern Med* 2013; 28: 1504-1510
Wilson & Scior *Research in Developmental Disabilities* 2014; 35: 294-321

Barriers


environmental barriers
legal barriers
myths
attitudes
legal barriers
environmental barriers
myths
misinformation
social barriers
language

Equality

The assumption is that **everyone benefits from the same supports**. This is equal treatment.

Equity

Everyone gets the supports they need (this is the concept of "affirmative action"), thus producing equity.

Justice

All 3 can see the game without supports or accommodations because **the cause(s) of the inequity was addressed**. The systemic barrier has been removed.

Universal Design

"Designing all products, buildings and exterior spaces to be useable by all people to the greatest extend possible."

Universal Design

- Equitable
  - Useful for diverse abilities
- Flexibility
  - Accommodates range of preferences and abilities
- Simple and intuitive
  - Understandable by all abilities
- Perceptible information
  - Communicates information regardless of sensory abilities
- Tolerance of error
  - Minimizes adverse consequences of unintended actions

Bickenbach *Disability and Rehabilitation* 2014; 36: 1320-1327

Universal Design

Examples in the dental office:

- Lever handles vs doorknobs
- Large print on written materials
- Headphones available
- Adjustable volume and light
- Larger family restrooms
- Ramped curbs

Respecting Differences

Health Care Disparities

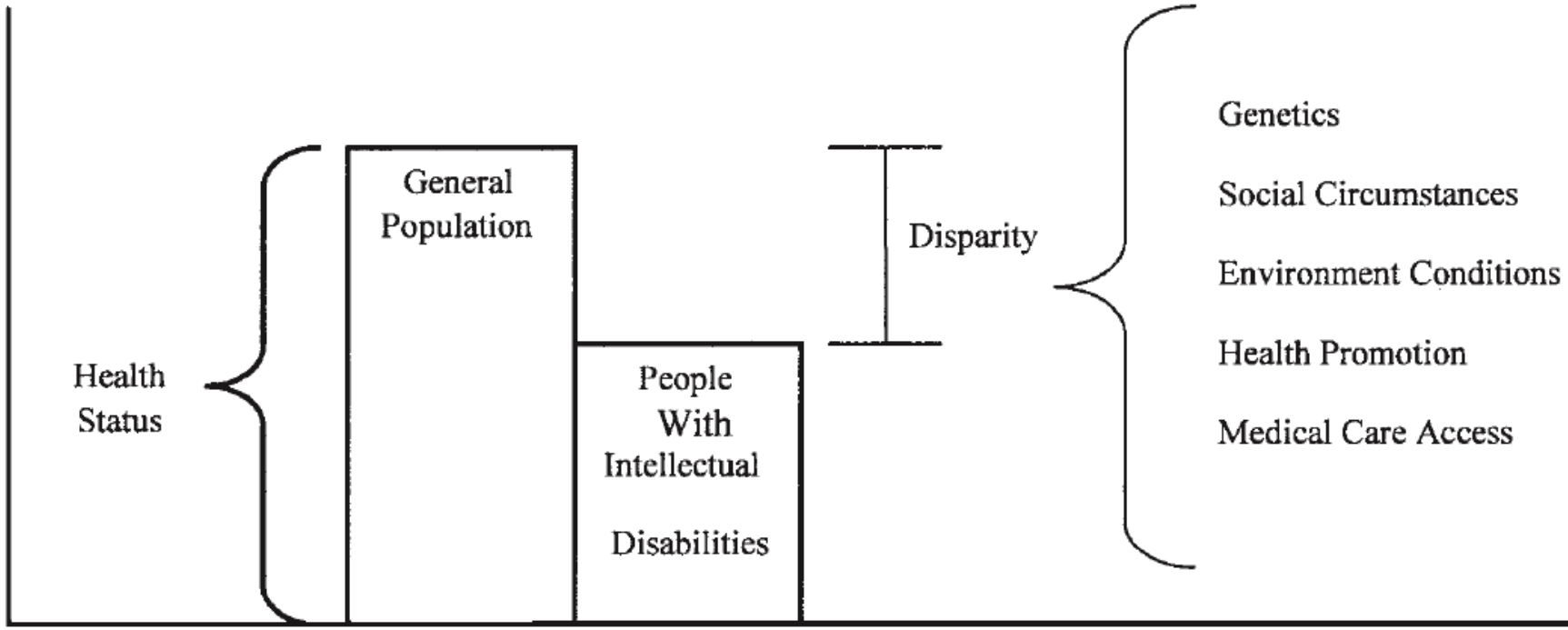


Fig. 1. Representation of determinants of health and health status disparities for persons with intellectual disabilities.

Krahn GL et al *Mental Retardation and Developmental Disabilities Research Reviews* 2006; 12: 70-82

Health Disparities

Literature consistently shows people with intellectual disabilities

- Have poorer health outcomes
- Receive less preventive care and health promotion
- Under diagnosis of chronic conditions

Krahn GL et al *Mental Retardation and Developmental Disabilities Research Reviews* 2006; 12: 70-82
Owens et al *Mental Retardation and Developmental Disabilities Research Reviews* 2006; 12: 28-40

Health Disparities

- Untreated pain frequently leads to behavior issues
- Frequently overmedicated to control behavior rather than diagnosing illness and treating sources of pain

Oral Health Disparities

- Higher incidence of
  - Poor oral hygiene
  - Gingivitis
  - Caries and untreated caries
- Receive less restorative care, more extractions
- Less preventive measures, such as sealants

Owens et al *Mental Retardation and Developmental Disabilities Research Reviews* 2006; 12: 28-40
McDonald, Avery, and Dean Dentistry for the Child and Adolescent 10th edition 2010

Barriers to Accessing Care

- Physical access
- Financial barriers
- Communication
- Transportation
- Lack of awareness of the need for dental care
- Discrimination

AAPD Guideline on CSHCN *Pediatric Dentistry* 2010; 32: 132-136
Fenton et al *Journal of Dental Education* 2003; 12: 1337-1344

Barriers to Providing Care

- Atypical presentations
- Communication
  - Difficulty explaining and understanding symptoms
- Lack of continuity of care
  - Both in health care and home care providers
- Lack of appropriate diagnostic systems
- Inadequate training of health professionals
- Problems go unrecognized and untreated

Krahn GL et al *Mental Retardation and Developmental Disabilities Research Reviews* 2006; 12: 70-82.
Special Olympics Changing Attitudes Changing the World The Health and Health Care of People with Intellectual Disabilities

Research

Research needed

- To understand the disparities and inequities
- To have an evidence base for clinical practice
- To modify screening, health promotion, preventive, and diagnostic methods for this patient population

Veenstra et al *Journal of Clinical Epidemiology* 2010; 63: 1091-1100
Fenton et al *Journal of Dental Education* 2003; 12: 1337-1344
Owens et al *Mental Retardation and Developmental Disabilities Research Reviews* 2006; 12: 28-40

Autism

Prevalence

- The ASD are the second most common serious developmental disability, after intellectual disability (formerly mental retardation)
- 500,000 US individuals between 0-21 years
- Unrelated to race, SES, education

Prevalence of Autism Spectrum Disorders --- Autism and Developmental Disabilities Monitoring Network, United States, 2006; December 18, 2009.

1970’s and 1980’s

1 in 2000

JG W, JP H, CE B. Systematic review of prevalence studies of autism spectrum disorders. Epub 2005 Apr 29: Arch Dis Child; 2006. p. 8-15.

1990’s

1 in 1000

JG W, JP H, CE B. Systematic review of prevalence studies of autism spectrum disorders. Epub 2005 Apr 29: Arch Dis Child; 2006. p. 8-15.

2012

1 in 88

Autism and Developmental Disabilities Monitoring Network Surveillance Year Principal I, Centers for Disease Control and P. Prevalence of autism spectrum disorders--Autism and Developmental Disabilities Monitoring Network, 14 sites, United States, 2008. MMWR Surveill Summ 2012;61(3):1-19

2018

1 in 59

Prevalence of Autism Spectrum Disorder Among Children Aged 8 Years – Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States 2014. Surveillance Summaries, April 27, 2018. 67 (6): 1-23

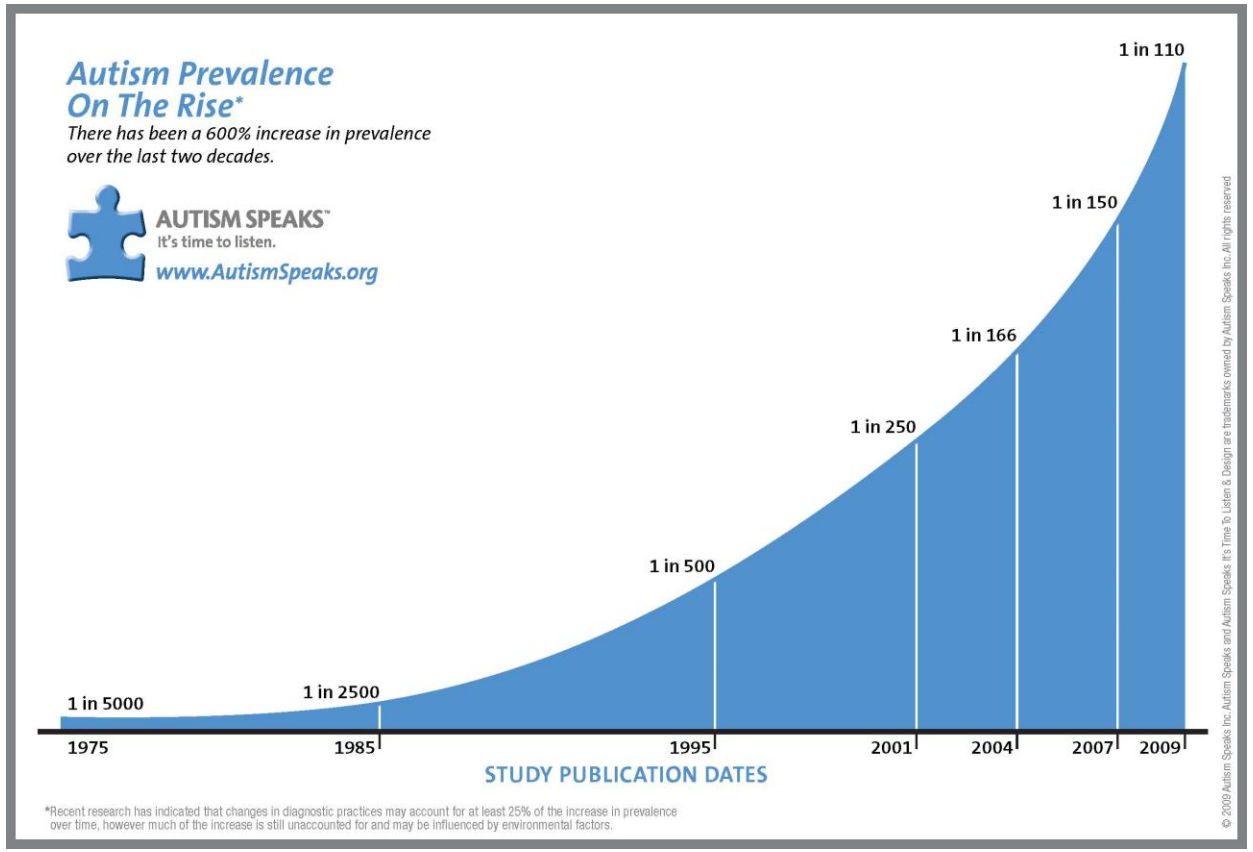
2013

1 in 50

Changes in Prevalence of Parent-reported Autism Spectrum Disorder in School-aged U.S. Children: 2007 to 2011-2012: National Health Statistics Reports; March 20 2013.

1 in 40

Kogan MD, Vladutiu CJ, Schieve LA, Ghandour RM, Blumberg SJ, Zablotsky B, Perrin JM, Shattuck P, Kuhlthau KA, Harwood RL, Lu MC. The Prevalence of Parent-Reported Autism Spectrum Disorder Among US Children. Pediatrics. 2018 Dec;142(6). pii: e20174161. doi: 10.1542/peds.2017-4161. PubMed PMID: 30478241


Autism Prevalence
On The Rise*
There has been a 600% increase in prevalence over the last two decades.
AUTISM SPEAKS™
It's time to listen.
www.AutismSpeaks.org
1 in 5000
1 in 2500
1 in 500
1 in 250
1 in 166
1 in 150
1 in 110
1975
1985
1995
2001
2004
2007
2009
STUDY PUBLICATION DATES
*Recent research has indicated that changes in diagnostic practices may account for at least 25% of the increase in prevalence over time, however much of the increase is still unaccounted for and may be influenced by environmental factors.
© 2009 Autism Speaks Inc. Autism Speaks and Autism Speaks It's Time To Listen & Design are trademarks owned by Autism Speaks Inc. All rights reserved

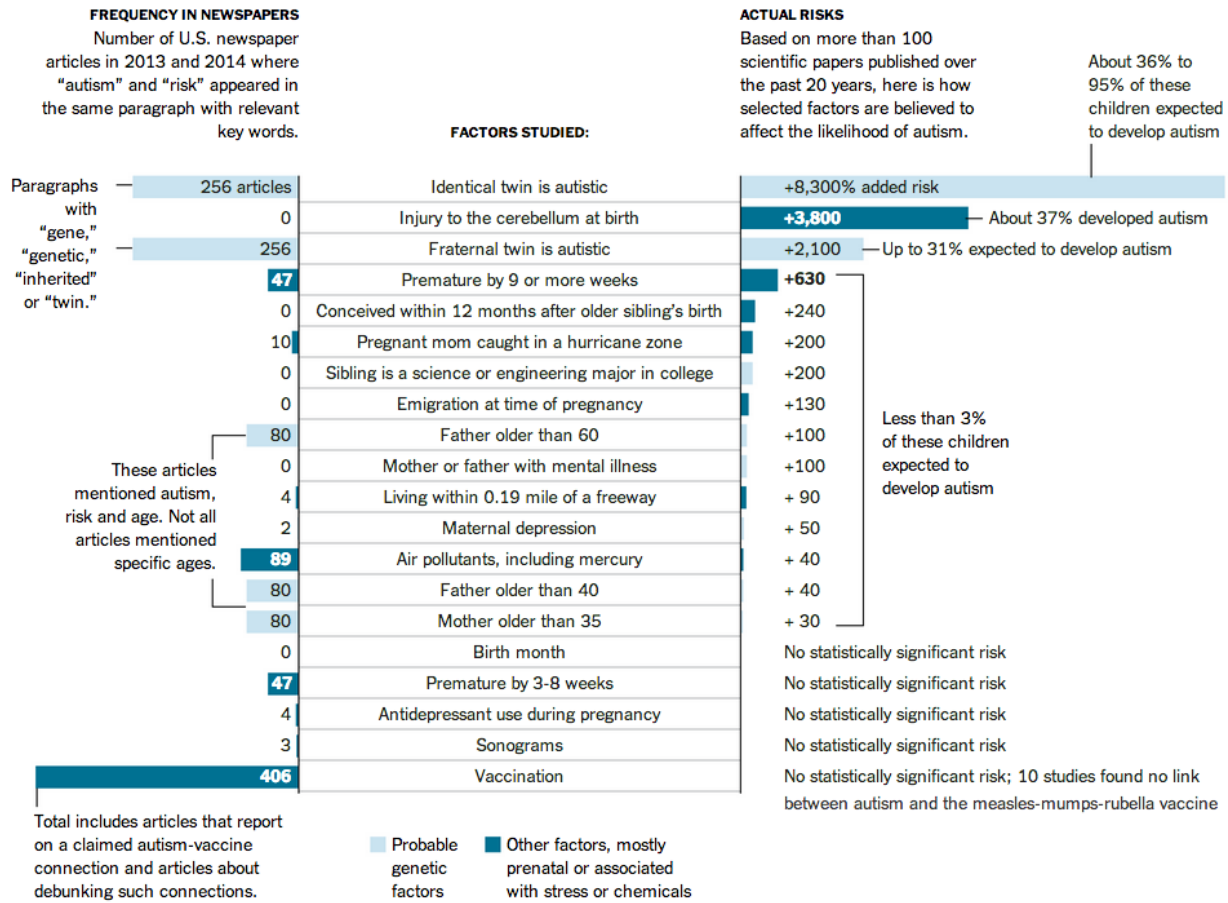
1 in 59 prevalence from 2012 Autism and Developmental Disabilities Monitoring (ADDM) Network

- Screening and abstracting evaluation data from providers (education and healthcare)
- Evaluation to determine if child meets ASD case status
- Prevalence for children aged 8 yrs old

1 in 40 prevalence from 2016 NSCH

- Nationally representative survey of 50,212 children aged 3-17 years
- Parent-reported information regarding whether child had received an ASD diagnosis by a care provider and current ASD status

Press Attention vs. the Scientific Evidence



By BILL MARSH

Sources: analysis by Sam Wang, Princeton University; Lexis-Nexis (2014 autism articles through March 25)

PEDIATRICS
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Trends in the Prevalence of Developmental Disabilities in US Children, 1997–2008

Coleen A. Boyle, Sheree Boulet, Laura A. Schieve, Robin A. Cohen, Stephen J. Blumberg, Marshalyn Yeargin-Allsopp, Susanna Visser and Michael D. Kogan

Pediatrics 2011;127;1034; originally published online May 23, 2011;
DOI: 10.1542/peds.2010-2989

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://pediatrics.aappublications.org/content/127/6/1034.full.html

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American Academy of Pediatrics
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Downloaded from pediatrics.aappublications.org at University of Washington on April 9, 2014

TABLE 4 Prevalence of ADHD, Autism, and Moderate to Profound Hearing Loss in Children Ages 3 to 17 years, by Select Characteristics and Time Period, NHIS, 1997–2008

Characteristics	ADHD, %				Percentage Change 1997–1999 versus 2006–2008	Autism, %				Percentage change 1997–1999 versus 2006–2008	Moderate to Profound Hearing Loss, %				Percentage Change 1997–1999 versus 2006–2008
	1997–1999	2000–2002	2003–2005	2006–2008		1997–1999	2000–2002	2003–2005	2006–2008		1997–1999	2000–2002	2003–2005	2006–2008	
Age, y															
3–10	4.16	4.80	4.74	5.19	24.8	0.27	0.40	0.72	0.87	222.2	0.54	0.43	0.45	0.34	−37.04
11–17	7.51	8.90	8.98	10.24	36.4	0.11	0.31	0.45	0.59	436.4	0.57	0.46	0.37	0.43	−24.56
Gender															
Male	8.43	9.55	9.44	10.59	25.6	0.31	0.58	0.94	1.12	261.3	0.65	0.57	0.52	0.42	−35.38
Female	2.83	3.73	3.96	4.39	55.1	0.07	0.11	0.22	0.34	385.7	0.45	0.31	0.30	0.35	−22.22
Race/ethnicity															
Non Hispanic white	6.74	7.95	7.80	8.89	31.9	0.16	0.36	0.74	0.88	450.0[a]	0.64	0.45	0.50	0.44	−31.25
Non Hispanic black	4.40	6.08	6.86	7.81	77.5	0.33	0.36	0.51	0.44	33.3	0.39	0.49	0.40	0.35[c]	−10.26
Hispanic	3.13	3.65	4.10	4.39	40.3	0.17	0.25	0.32	0.47	176.5[a]	0.37	0.40	0.20	0.32	−13.51
Mother's education:															
Less than high school	5.08	5.42	5.89	5.44	7.1	0.19	0.16	0.33	0.33	73.7	0.68	0.57	0.47	0.51	−25.00
High school/some college	6.07	7.27	7.33	8.43	38.9	0.16	0.37	0.62	0.85	431.3	0.62	0.50	0.49	0.37	−40.32
College or greater	4.51	5.47	5.15	6.09	35.0	0.27	0.49	0.73	0.88	225.9	0.31	0.24	0.24[c]	0.32	3.23
% of poverty level															
<200	6.05	6.98	7.13	8.54	41.2	0.22	0.35	0.48	0.69	213.6	0.84	0.71	0.55	0.47	−44.05
≥200%	5.45	6.55	6.53	6.89	26.4	0.17	0.35	0.65	0.78	358.8	0.36	0.28	0.32	0.32	−11.11
Health insurance															
Private	5.23	6.18	6.25	6.46	23.5	0.16	0.31	0.63	0.73	356.3	0.41	0.34	0.31	0.31	−24.39
Medicaid or CHIP	8.81	9.40	8.88	10.64	20.8	0.36	0.59	0.59	0.94	161.1	1.29	0.86	0.62	0.55	−57.36
Uninsured	4.33	5.03	5.50	5.17	19.4	[b]	0.22[c]	0.26[c]	0.20[c]	[d]	0.44	0.32[c]	0.61[c]	0.41[c]	−7.3

[a] Test of linear trend over 4 time periods, $P < .05$.
[b] Estimates with an SE of higher than 50% are not shown.
[c] Estimates have a relative SE of more than 30% and less than or equal to 50% and should be used with caution because they do not meet the standards of reliability or precision.
[d] Not calculated because of imprecise estimates.

Diagnosis

DSM-IV

The Diagnostic and Statistical Manual of Mental Disorders Fourth Edition

Published by the American Psychiatric Association in 1994

DSM-IV

Pervasive Developmental Disorders

- Autistic Disorder
- Asperger's Disorder
- Childhood Disintegrative Disorder
- PDD-Not Otherwise Specified
- Rett's Disorder*

American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 4th edn. Washington, DC: American Psychiatric Association; 1994

DSM-IV

Symptoms

Socialization

Communication

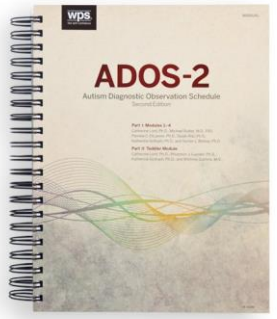
Behavior

American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 4th edn. Washington, DC: American Psychiatric Association; 1994

Gold Standard Instruments for ASD Diagnosis

Autism Diagnostic Interview

Autism Diagnostic Observation Schedule



*DSM 5 criteria came about because of inconsistent diagnosis, even by expert diagnostic clinicians

*Provides one ASD diagnosis rather than many different ones, with lack of consistency

DSM-5

The Diagnostic and Statistical Manual of Mental Disorders Fifth Edition

Published May 18, 2013

Autism spectrum disorder is a biologically based neurodevelopmental disorder characterized by persistent deficits in social communication and social interaction, and restricted, repetitive patterns of behavior, interests, and activities.

Kurita H. How to deal with the transition from Pervasive Developmental Disorders in DSM-IV to Autism Spectrum Disorder in DSM-V. Psychiatry Clin Neurosci 2011;65(7):609-10.

DSM-5

Autism Spectrum Disorder

Social Communication

Fixated Interests and Repetitive Behaviors

Symptoms Existing in Early Childhood

Symptoms Impairing Functioning

Kurita H. How to deal with the transition from Pervasive Developmental Disorders in DSM-IV to Autism Spectrum Disorder in DSM-V. Psychiatry Clin Neurosci 2011;65(7):609-10.

What is Autism?

'Autism's like a snowflake' - doctors study symptoms, possible causes of autism with hopes of learning more

Posted Aug 28, 2011

1 236 shares

By Rob Scott/Gloucester County Times

Shannon Aylmer, 5,

The name Snowflakes was chosen for our group because children with autism are like snowflakes – they are beautiful, each one is uniquely different and they are liable to meltdown at any time!

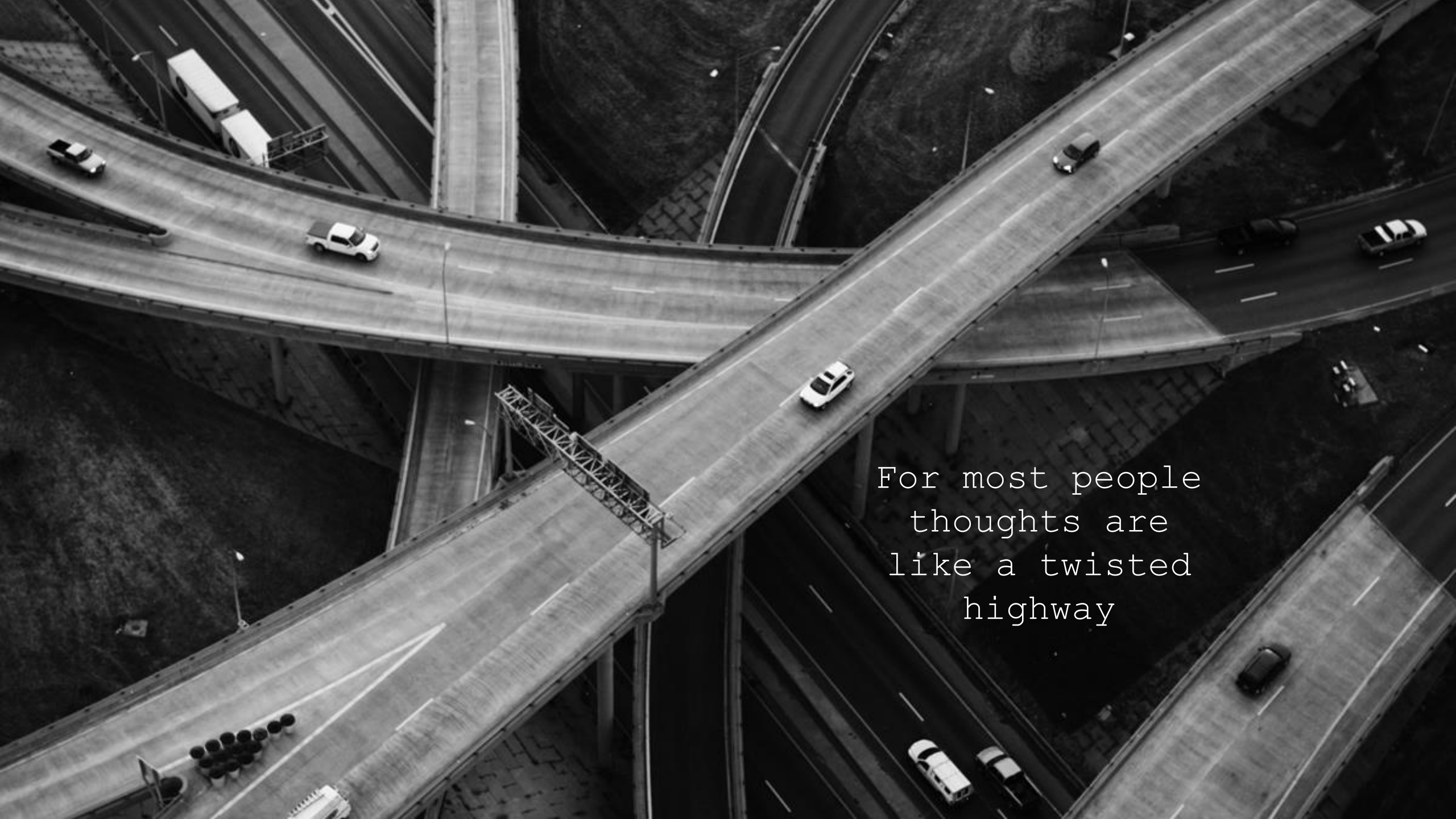
STOP USING KIDS

Fox News' Tammy Bruce: Sorry I Called an Autistic Boy a 'Snowflake'

The long-time contributor and conservative author offered an apology Tuesday for having mocked a 10-year-old autistic boy on national TV as an "aggrieved" "snowflake."

Andrew Kirell 05.16.17 11:43 AM ET

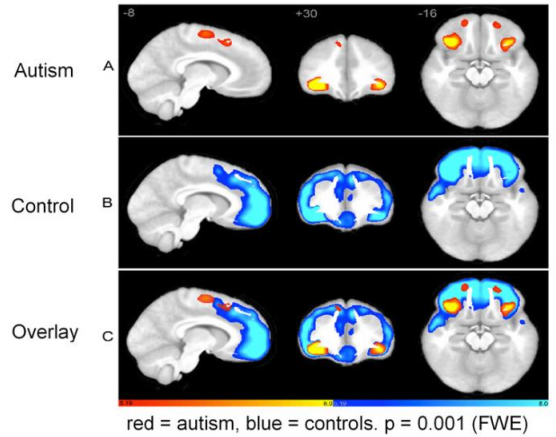
Fox News


For most people
thoughts are
like a twisted
highway

For people with autism it may be as if there are
some bridges to nowhere

Functional MRI in Autism

- Long-range functional hypoconnectivity and short-range hyper-connectivity
- Decreased anterior-posterior functional connectivity during resting states
- Hypoactivation in nodes of the “social brain” during social processing tasks
- Differential lateralization and activation of language processing and production regions during communication tasks



People with autism show lower brain activity in specific regions as compared to control subjects. Image courtesy of Brandon A. Zielinski, MD, PhD

Dichter GS. Functional magnetic resonance imaging of autism spectrum disorders. Dialogues Clin Neurosci. 2012 Sep;14(3):319-51. Review.

Stereotypical Behaviors

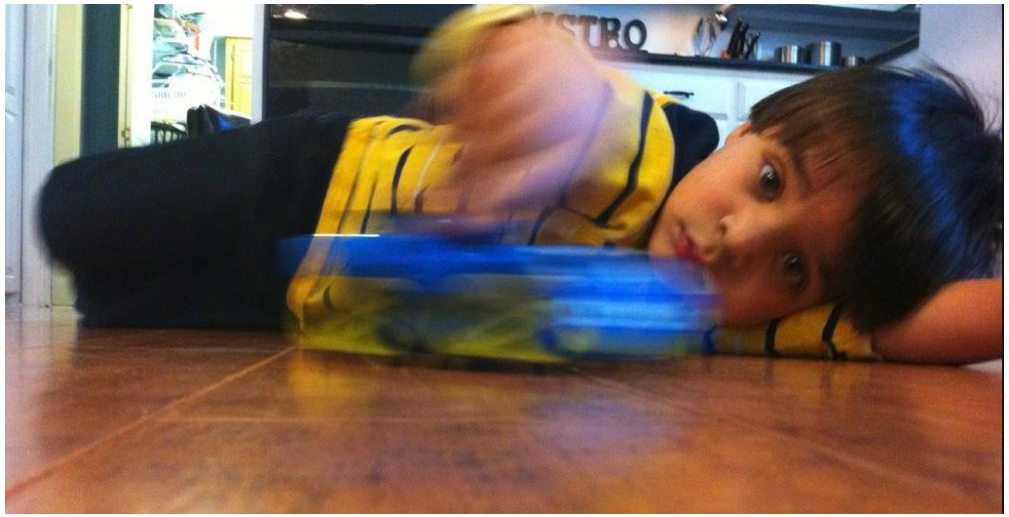
Stereotypical Behaviors

Motor mannerisms are reported in 37-95% of individuals with ASD

Filipek PA, Accardo PJ, Ashwal S, et al. Practice parameter: screening and diagnosis of autism: report of the Quality Standards Subcommittee of the American Academy of Neurology and the Child Neurology Society. Neurology 2000; 55:468.

Restrictive, Repetitive Interests/Behaviors

- Significant preference for routine
- Lacking pro-social communication
- Interests that are unusual in interest or intensity
- Examples: hand flapping, finger flipping, twisting, rocking, swaying, dipping, toe walking



Pintrest.com

Restrictive, Repetitive Interests/Behaviors: Examples

- Always eating particular foods in a specific order
- Always following the same route from one place to another
- Always talking about the same things or repetitive questioning about a particular topic
- Not tolerating deviations from “normal” or “expected” rules of conduct

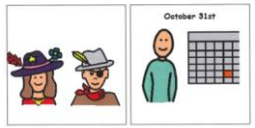
UpToDate, accessed 1/2019

Need for rigid routines

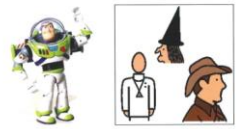
JM C. Dental care in children with developmental disabilities: attention deficit disorder, intellectual disabilities, and autism. Chic: J Dent Child; 2010. p. 84-91

WHAT TO DO ON HALLOWEEN

Halloween is a day where kids get to dress up in costumes, have fun with their friends and family, and get candy. Halloween happens on October 31st.



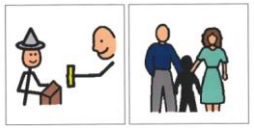
People dress up as lots of different things. I might see a doctor, a pirate, a witch, a cowboy, or Buzz Lightyear.



When I see someone in a costume, I might want to know who it is. I should not try to take off the mask or costume by myself. I can use my words to ask them or ask my parent.

I should not be scared when I see people in costumes. They are just pretending and having fun on Halloween, like me!

On Halloween we can go Trick-or-Treating. This means a mom or dad will take us places to get candy and wear our costumes. We can ONLY go Trick-or-Treating on Halloween and ONLY with an adult.

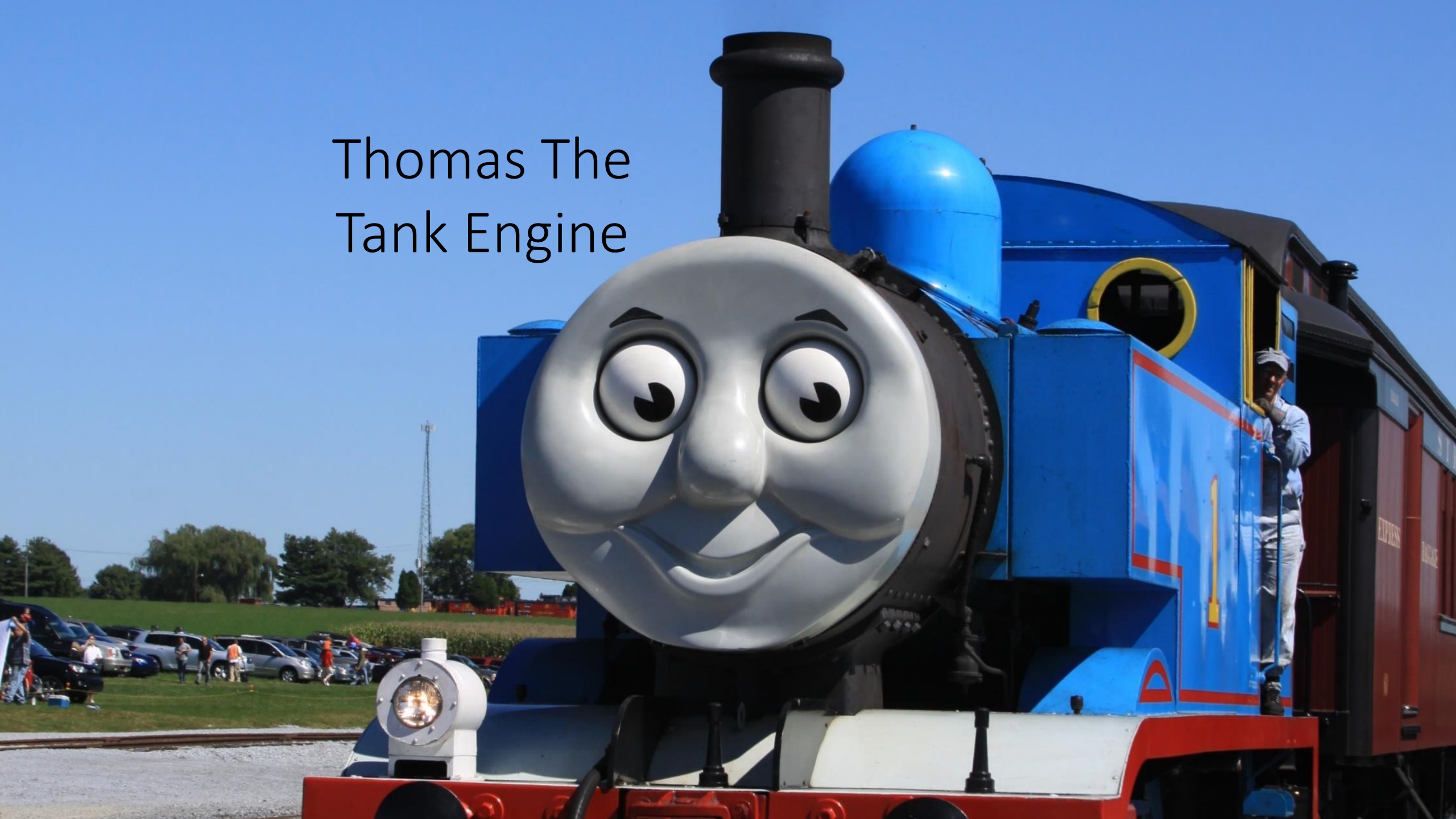


If we Trick-or-Treat at someone's house, I should not go inside when they open the door. Instead, I wait outside and say, "Trick-or-Treat!"

On Halloween, Mommies and Daddies make the rules about when to eat candy. Sometimes, there will be candy that I can't eat. Mom and Dad will make sure that I still get a special treat on Halloween.

Halloween is a fun day!

HONDA
OHC
HONDA


Thomas The
Tank Engine

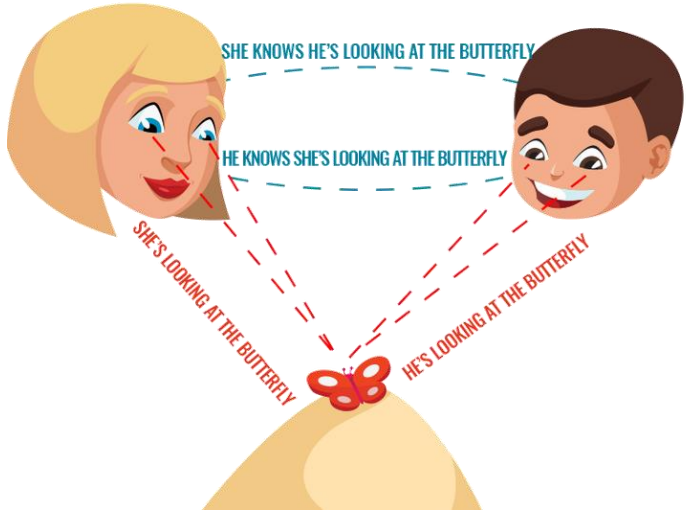
Thomas The Tank Engine

- Children on the autism spectrum associate with Thomas before any other children's character (57%)
- These children maintain their association with Thomas longer than for other characters, commonly two years longer than their typically developing siblings
- Around a third of parents consider that their children have an 'obsessive' relationship with Thomas

http://www.autism.org.uk/about-autism/our-publications/reports/our-policy-and-research-reports/children-with-autism-and-thomas-the-tank-engine.aspx

Joint Attention

- Children who lack joint attention may not show, bring, or point out objects of interest to other people.
- They may be described by their parents as “good” infants and toddlers, undemanding of attention.
- They may point to obtain an object they want.



Autilius.com

Johnson CP, Myers SM, American Academy of Pediatrics Council on Children With Disabilities. Identification and evaluation of children with autism spectrum disorders. Pediatrics 2007; 120:1183.

Johnson CP. Recognition of autism before age 2 years. Pediatr Rev 2008; 29:86.

Sensory Profile

It has been said that children with ASD have a *sensory profile* that is essentially opposite that of a child without disabilities

J E, W D. The sensory profile: a discriminant analysis of children with and without disabilities: Am J Occup Ther; 1998. p. 283-90

Hyperresponders

Anxiety and subsequent repetitive behaviors

May avoid:

- Noise
- Light
- Taste
- Textures

Hyporesponders

Sensory seeking

May pursue:

- Smells
- Lights
- Movement
- Textures

Aberrant Sensory Perception: Examples

- Visual inspection of objects out of the corner of the eyes
- Preoccupation with edges, spinning objects, or shiny surfaces, lights, or odors
- Refusal to eat foods with certain tastes or textures
- Preoccupation with sniffing or licking nonfood objects
- Apparent indifference to pain
- Hypersensitivity to certain frequencies or types of sound, with lack of response to sounds that might startle others.

Teplin SW. Autism and related disorders. In: Developmental-Behavioral Pediatrics, 3rd ed, Levine MD, Carey WB, Crocker AC (Eds), WB Saunders, Philadelphia 1999. p.589

Associated Neurodevelopmental Conditions

- Anxiety disorder
  - 42-55% comorbidity
  - Some debate over whether anxiety is a core feature of ASD
- ADHD
  - 30-50% comorbidity
- Oppositional defiant disorder
- Depression and Mood disorders
- Tic disorders (hyperkinetic movement disorder)

UpToDate, accessed 1/2019

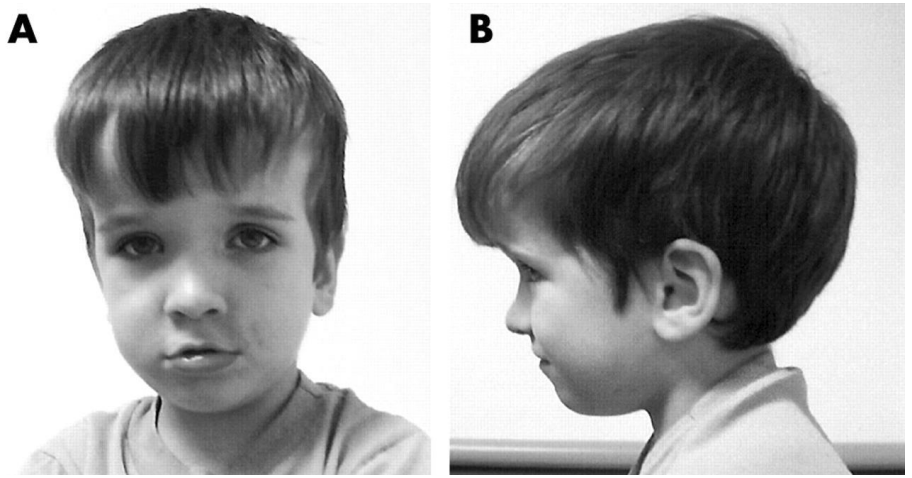
Sleep Problems

- Sleep-onset disturbances
- Problems maintaining sleep
- Abnormal sleep architecture

UpToDate Accessed 1/2019

Macrocephaly

- Approximately 1/4 of children with ASD have head circumference greater than the 97th percentile
- Increased rate of head growth is found in up to 70% of children with ASD
- By 2-4 years of age, mean brain volume is increased and megalencephaly is present in some children



Butler MG, Dasouki MJ, Zhou X, *et al* Subset of individuals with autism spectrum disorders and extreme macrocephaly associated with germline *PTEN* tumour suppressor gene mutations *Journal of Medical Genetics* 2005;**42**:318-321

Courchesne E, Carper R, Akshoomoff N. Evidence of brain overgrowth in the first year of life in autism. JAMA 2003; 290:337.
Hazlett HC, Gu H, Munsell BC, et al. Early brain development in infants at high risk for autism spectrum disorder. Nature 2017; 542:348.
Courchesne E, Karns CM, Davis HR, et al. Unusual brain growth patterns in early life in patients with autistic disorder: an MRI study. Neurology 2001; 57:245.

Therapy: It’s a Team Approach

• Parents
• Social worker
• Primary care provider (PCP)
• Developmental pediatrician
• Psychologist or psychiatrist
• Neurologist
• Nutritionist
• Behavioral therapist
• Physical therapist
• Occupational therapist
• Speech therapist
• Teacher and teacher’s aid

Common Therapies

www.todossomosuno.com

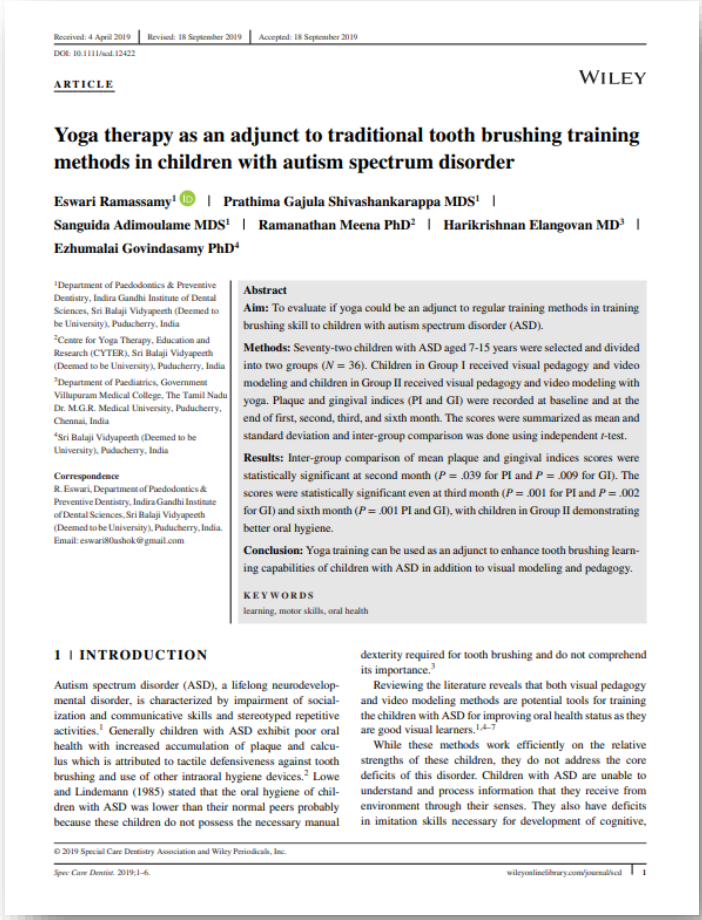
Children May Participate in Many Other Therapies

- Pet Therapy
- Acupuncture
- Music
- Art
- Yoga

www.extraordinaryhorses.org

Yoga has been shown to improve:

- Focus
- Concentration
- Imitation skills
- Verbal communication
- Nonverbal communication
- Gross motor skills
- Tolerance to touch
- Self-esteem
- Emotional bonding
- Shared attention



Received: 4 April 2019 | Revised: 18 September 2019 | Accepted: 18 September 2019
DOI: 10.1111/scd.12422

ARTICLE

WILEY

Yoga therapy as an adjunct to traditional tooth brushing training methods in children with autism spectrum disorder

Eswari Ramassamy[1] | **Prathima Gajula Shivashankarappa MDS**[1] | **Sanguida Adimoulame MDS**[1] | **Ramanathan Meena PhD**[2] | **Harikrishnan Elangovan MD**[3] | **Ezhumalai Govindasamy PhD**[4]

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[2]Centre for Yoga Therapy, Education and Research (CYTER), Sri Balaji Vidyapeeth (Deemed to be University), Puducherry, India
[3]Department of Paediatrics, Government Villupuram Medical College, The Tamil Nadu Dr. M.G.R. Medical University, Puducherry, Chennai, India
[4]Sri Balaji Vidyapeeth (Deemed to be University), Puducherry, India

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Email: eswari80ashok@gmail.com

Abstract

Aim: To evaluate if yoga could be an adjunct to regular training methods in training brushing skill to children with autism spectrum disorder (ASD).

Methods: Seventy-two children with ASD aged 7-15 years were selected and divided into two groups ($N = 36$). Children in Group I received visual pedagogy and video modeling and children in Group II received visual pedagogy and video modeling with yoga. Plaque and gingival indices (PI and GI) were recorded at baseline and at the end of first, second, third, and sixth month. The scores were summarized as mean and standard deviation and inter-group comparison was done using independent *t*-test.

Results: Inter-group comparison of mean plaque and gingival indices scores were statistically significant at second month ($P = .039$ for PI and $P = .009$ for GI). The scores were statistically significant even at third month ($P = .001$ for PI and $P = .002$ for GI) and sixth month ($P = .001$ PI and GI), with children in Group II demonstrating better oral hygiene.

Conclusion: Yoga training can be used as an adjunct to enhance tooth brushing learning capabilities of children with ASD in addition to visual modeling and pedagogy.

KEYWORDS
learning, motor skills, oral health

1 | INTRODUCTION

Autism spectrum disorder (ASD), a lifelong neurodevelopmental disorder, is characterized by impairment of socialization and communicative skills and stereotyped repetitive activities.[1] Generally children with ASD exhibit poor oral health with increased accumulation of plaque and calculus which is attributed to tactile defensiveness against tooth brushing and use of other intraoral hygiene devices.[2] Lowe and Lindemann (1985) stated that the oral hygiene of children with ASD was lower than their normal peers probably because these children do not possess the necessary manual dexterity required for tooth brushing and do not comprehend its importance.[3]

Reviewing the literature reveals that both visual pedagogy and video modeling methods are potential tools for training the children with ASD for improving oral health status as they are good visual learners.[1,4–7]

While these methods work efficiently on the relative strengths of these children, they do not address the core deficits of this disorder. Children with ASD are unable to understand and process information that they receive from environment through their senses. They also have deficits in imitation skills necessary for development of cognitive,

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Ramassamy E, Gajula Shivashankarappa P, Adimoulame S, Meena R, Elangovan H, Govindasamy E. Yoga therapy as an adjunct to traditional tooth brushing training methods in children with autism spectrum disorder. Spec Care Dentist. 2019 Oct 30.

- 72 Children dived into 2 groups
  - Visual pedagogy and video modeling
  - Visual pedagogy and video modeling + 1 hr daily yoga practice
- Plaque index and gingival index assessed at 1, 2, 3, and 6 months

Received: 4 April 2019 | Revised: 18 September 2019 | Accepted: 18 September 2019
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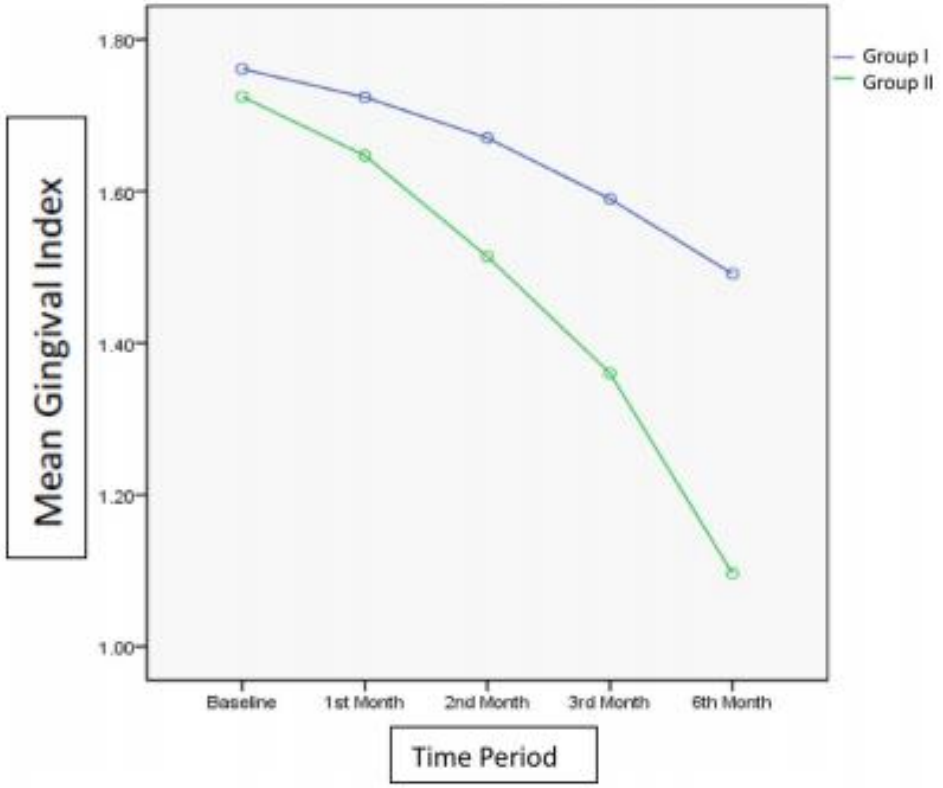
Yoga Practice included:

- Warm-up exercises (e.g. toe touching)
- Harmonizing and loosening
- Asanas (e.g. downward dog)
- Breathing exercises (pranayama)

- Mean plaque and gingival index scores were not statistically different at one month
- At all other follow-up points children in Group II (Yoga) demonstrated better oral hygiene ($P < 0.05$)



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“A Culture of Autism”

What is the best way to refer to children with autism?

Autistic?

Say This	Not This
people with disabilities	the handicapped, the disabled
people without disabilities	normal, healthy, whole or typical people
person who has a congenital disability	person with a birth defect
person who has (or has been diagnosed with)...	person afflicted with, suffers from, a victim of...
person who has Down syndrome	Downs person, mongoloid, mongol
person who has (or has been diagnosed with) autism	the autistic
person with quadriplegia, person with paraplegia, person diagnosed with a physical disability	a quadriplegic, a paraplegic
person with a physical disability	a cripple
person of short stature, little person	a dwarf, a midget
person who is unable to speak, person who uses a communication device	dumb, mute
people who are blind, person who is visually impaired	the blind
person with a learning disability	learning disabled
person diagnosed with a mental health condition	crazy, insane, psycho, mentally ill, emotionally disturbed, demented
person diagnosed with a cognitive disability or with an intellectual and developmental disability	mentally retarded, retarded, slow, idiot, moron
student who receives special education services	special ed student, special education student
person who uses a wheelchair or a mobility chair	confined to a wheelchair; wheelchair bound
accessible parking, bathrooms, etc.	handicapped parking, bathrooms, etc.

TEXAS COUNCIL *for* DEVELOPMENTAL DISABILITIES

Delayed?

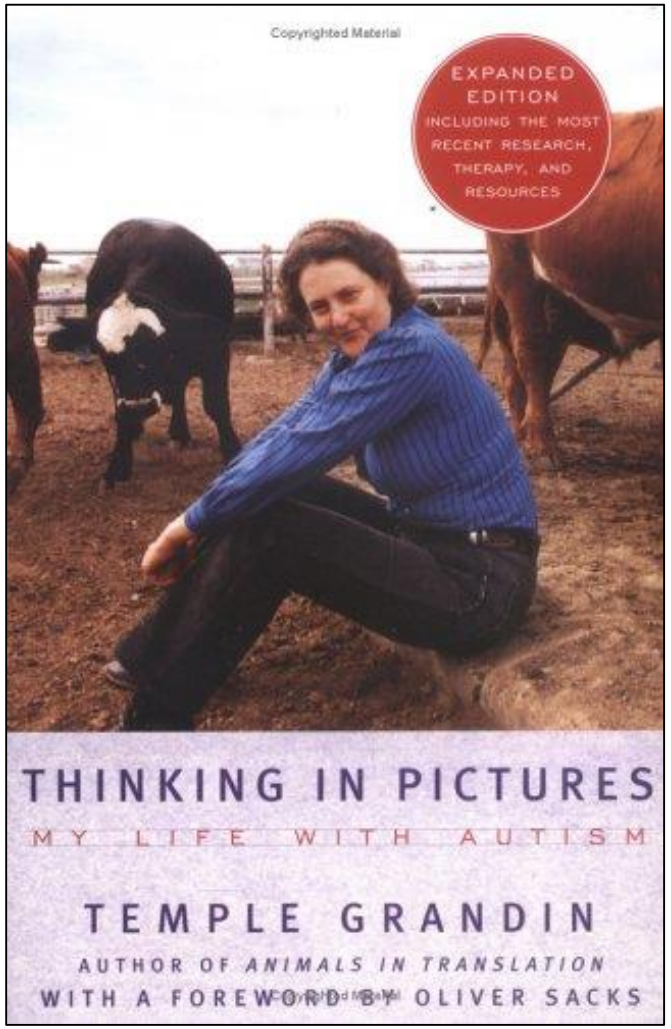
High Functioning?

Normal?

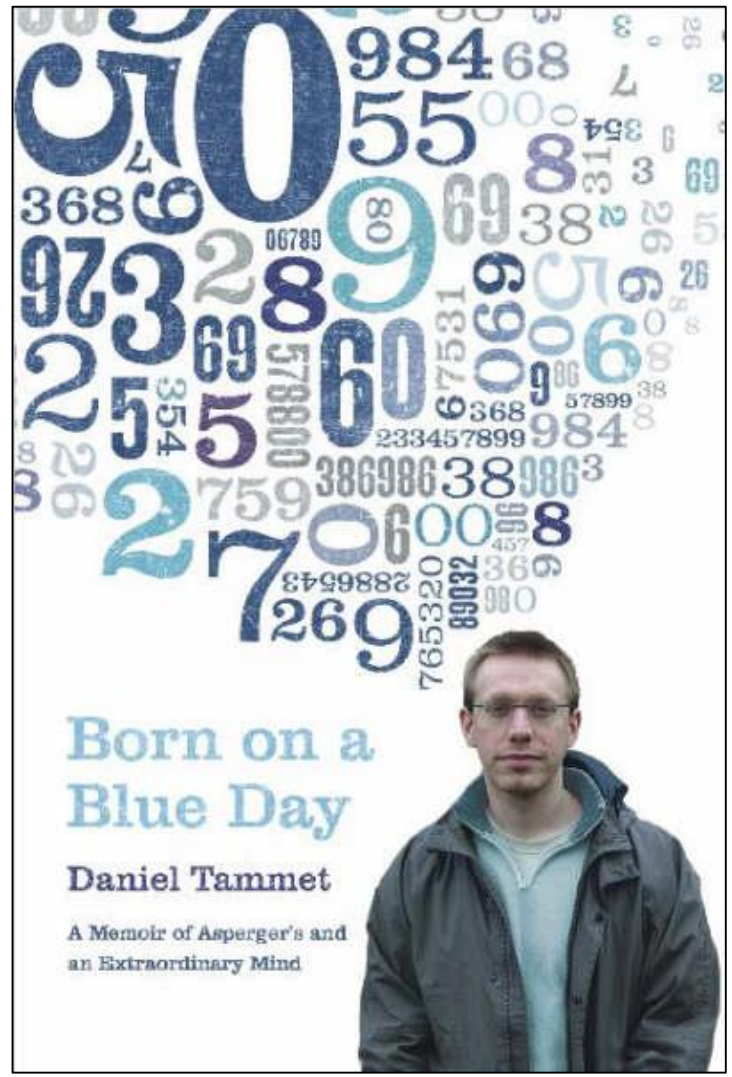
Autism in the Popular Press

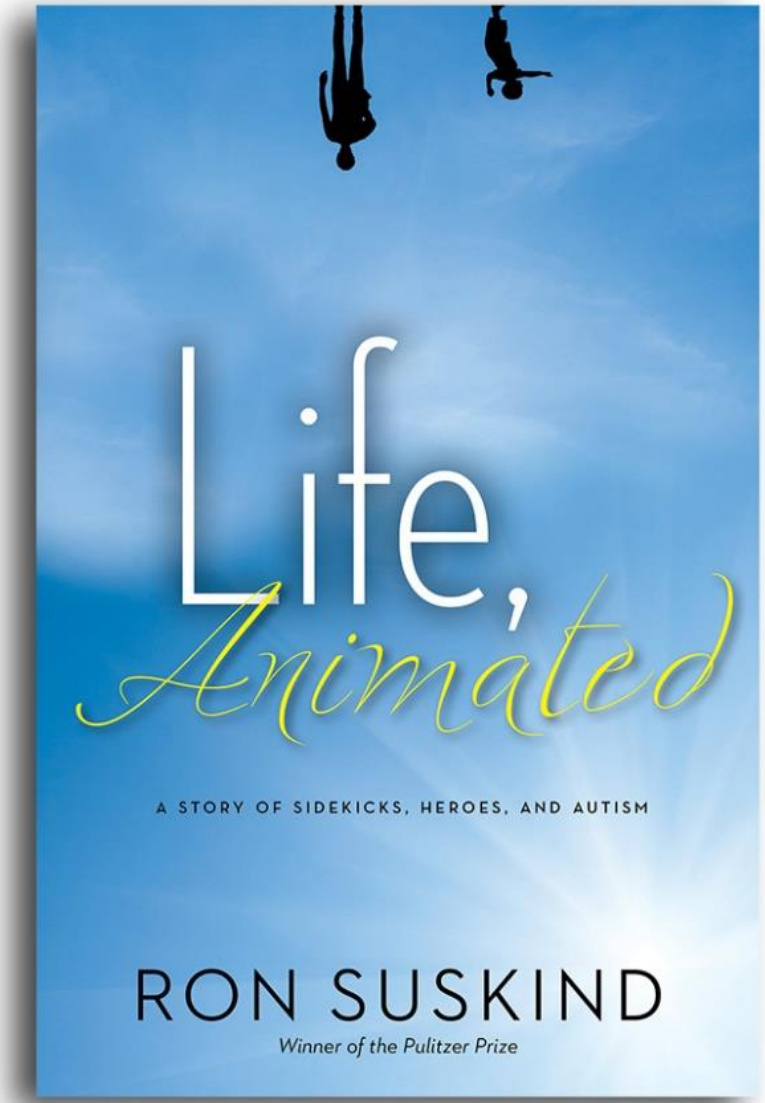
123
SESAME STREET
MEET JULIA

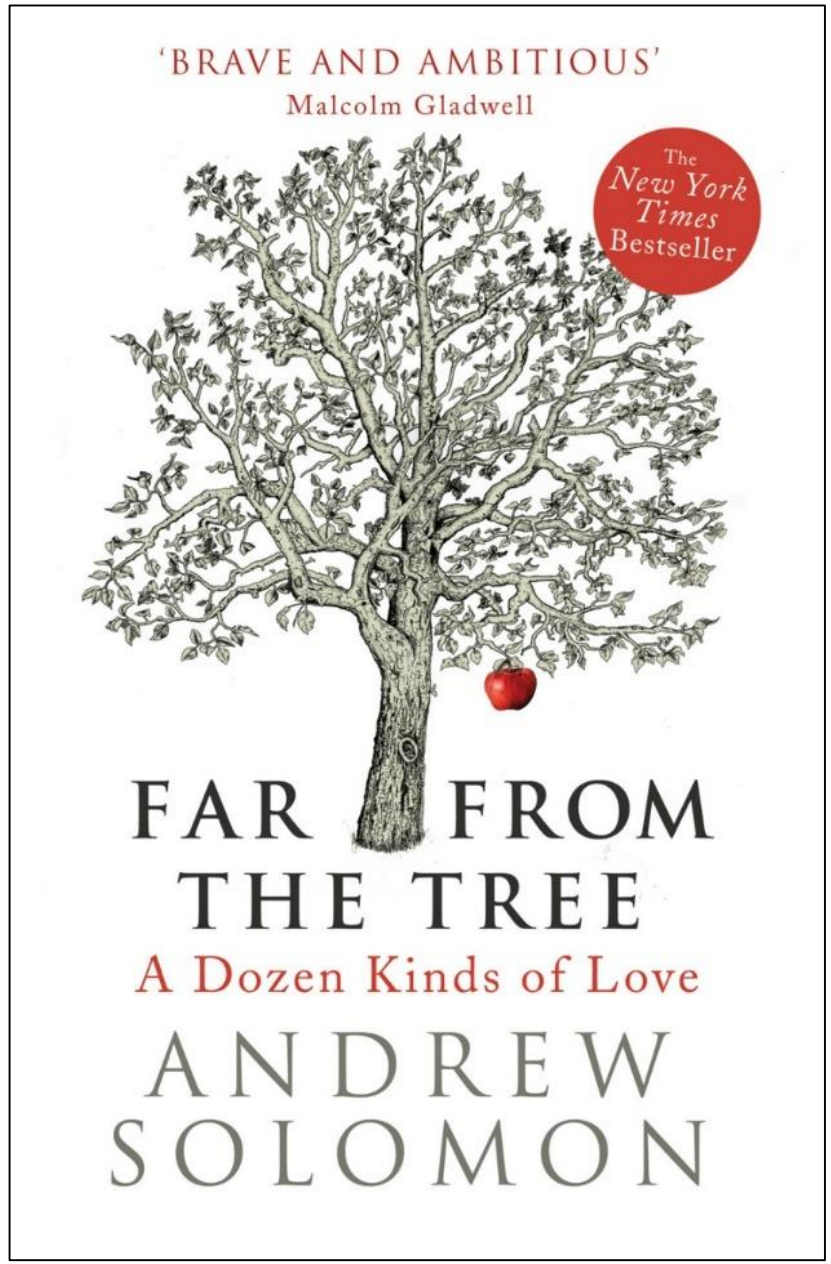
My Favorite Autism Reads



UNIVERSITY of
WASHINGTON
THE GRADUATE SCHOOL
UNIVERSITY of WASHINGTON


Born on a
Blue Day
Daniel Tammet
A Memoir of Asperger's and
an Extraordinary Mind


Life,
Animated
A STORY OF SIDEKICKS, HEROES, AND AUTISM
RON SUSKIND
Winner of the Pulitzer Prize


'BRAVE AND AMBITIOUS'
Malcolm Gladwell
The New York Times Bestseller
FAR FROM THE TREE
A Dozen Kinds of Love
ANDREW SOLOMON

Communication

Communication Disorders

- Language disorders
- Speech sound disorders
- Social Communication disorders

*may be congenital or developmental

*pediatric communication disorders occur in the context of ongoing speech, language, and cognitive development

Language Disorders

Disorder may involve

- form (e.g. syntax-white dog vs perro blanco)
- content (e.g. meaning-dog is a 4 legged animal that barks)
- use (e.g. situation- when to use “please” and “thank you”)

Speech Sound Disorders

- **Articulation** disorders: problems pronouncing “r” “s” “th”
- **Phonologic** disorders: patterned incorrect use “spy = pie” “blow = bow”
- **Motor** speech disorders: neurologic origin
  - Apraxia of speech-brain has difficulty with speech movements
  - Dysarthria-result from damage of neuromuscular pathway (spastic or flaccid depending on region of neuronal damage)
  - Fluency-e.g. stuttering

Social Communication Disorders

Using the “right” language at the “right” time

Example: “how do you do” is appropriate in formal communication with adults, but may seem awkward when used with younger peers

Impaired Pragmatic Language

- Not using language as a tool (e.g. echolalia)
- Difficulty initiating or sustaining a conversation due to lack of turn-taking or over-focus on personal interests
- Difficulty choosing appropriate words or topics (e.g. speaking too bluntly)
- Providing responses that are unrelated to the topic of conversation

Social Communication

- Reduced gestures, pointing, descriptive language
- Increased social demands when child begins school
- Deficits become more clear

*There is almost nothing more challenging to process than social information

Parents Magazine

Social Cognition

- Misunderstanding the emotional responses of others (e.g. believing someone is scared when they are happy)
- Responding inappropriately to another's distress (e.g. laughing)
- Difficulty inferring the intentions, beliefs, attitudes, or likely behaviors of others.

Beer JS, Ochsner KN. Social cognition: a multi level analysis. Brain Res 2006; 1079:98.

Early Language

- Delays and deviations in language development are one of the most common presenting complaints of children with ASD
- Approximately 1/4 to 1/3 of children with ASD achieve early language milestones but have regression or plateau of language, communication, and/or social skills between 15-24 months of age

www.helpmykidlearn.ie

Werner E, Dawson G. Validation of the phenomenon of autistic regression using home videotapes. Arch Gen Psychiatry 2005; 62:889.
De Giacomo A, Fombonne E. Parental recognition of developmental abnormalities in autism. Eur Child Adolesc Psychiatry 1998; 7:131.

Clear Communication

We Say:

- Hold Your Horses Cowboy!
- It's a piece of cake!
- It's raining cats and dogs!

We <u>Should</u> Say:

- Please stop running!
- It will be easy for you to do!
- It's raining very hard!

Ten Things Every Child With Autism Wishes You Knew, Ellen Notbohm, 2005
Image: Farmer's Almanac

“Remember that all behavior is a form of communication”

Ten Things Every Child With Autism Wishes You Knew, Ellen Notbohm, 2005
Image: Farmer’s Almanac

ALL Children with ASD have Communication Challenges

- Use the parent as an interpreter
- Determine receptive/expressive abilities
- Speak slowly
- Use consistent terminology
- Employ calm nonverbal communication
- Ask about Augmentative and Alternative Communication (AAC)

American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 5th edn. Washington, DC: American Psychiatric Association; 2013

SOCIAL WORK IN HEALTH CARE
2016, VOL. 55, NO. 6, 409–426
http://dx.doi.org/10.1080/00981389.2016.1178679

Routledge
Taylor & Francis Group

Experiences of emergency department care from the perspective of families in which a child has autism spectrum disorder

David B. Nicholas, PhD, RSW[a], Lonnie Zwaigenbaum, MD[b], Barbara Muskat, PhD, RSW[c], William R. Craig, MDCM[b], Amanda S. Newton, PhD[a], Christopher Kilmer, BSW, RSW[a], Andrea Greenblatt, MSW, RSW[c], Wendy Roberts, MD[d], and Justine Cohen-Silver, MSc, MD, FRCPC, MPH[e]

[a]Faculty of Social Work, University of Calgary (Central and Northern Alberta Region), Edmonton, Alberta, Canada; [b]Department of Pediatrics, Faculty of Medicine & Dentistry, University of Alberta, Edmonton, Alberta, Canada; [c]Department of Social Work, Hospital for Sick Children, Toronto, Ontario, Canada; [d]Integrated Services for Autism and Neurodevelopmental Disorders, Toronto, Ontario, Canada; [e]Department of Pediatrics, University of Toronto, Toronto, Ontario, Canada

ABSTRACT

Care for children with autism spectrum disorder (ASD) in the emergency department (ED) is increasingly recognized as difficult. Communication, sensory and behavioral challenges in a high intensity environment pose risks for negative experiences and outcomes. Through semi-structured interviews, parents (n = 31) and their children (n = 4) with ASD shared their perspectives on ED care. Participants identified issues that negatively affected care experiences, including care processes, communication issues, insufficient staff knowledge about ASD, and inadequate partnership with parents. Elements contributing to an improved ED experience were also cited, including staff knowledge about ASD, child- and family-centered care, and clarity of communication. Findings inform an emerging model of ED care. Recommendations for capacity building and practice development are offered.

ARTICLE HISTORY
Received 1 February 2016
Revised 21 March 2016
Accepted 12 April 2016

KEYWORDS
Acute care; autism; emergency department; hospital; pediatrics; qualitative

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Introduction

The management of health difficulties among children with autism spectrum disorder (ASD) is increasingly recognized as complex and challenging. Children with ASD may have needs that require sensitivity and proactive responses to intrusive procedures and intensive environments (Muskat et al., 2015; Muskat et al., 2016; Nicholas et al., 2016; Seid, Sherman, & Seid, 1997; Souders, DePaul, Freeman, & Levy, 2002; Van Der Walt & Moran, 2001; Zwaigenbaum et al., 2016). The hospital setting, and particularly the emergency department (ED), are environments with inherent acuity and intensity of communication.

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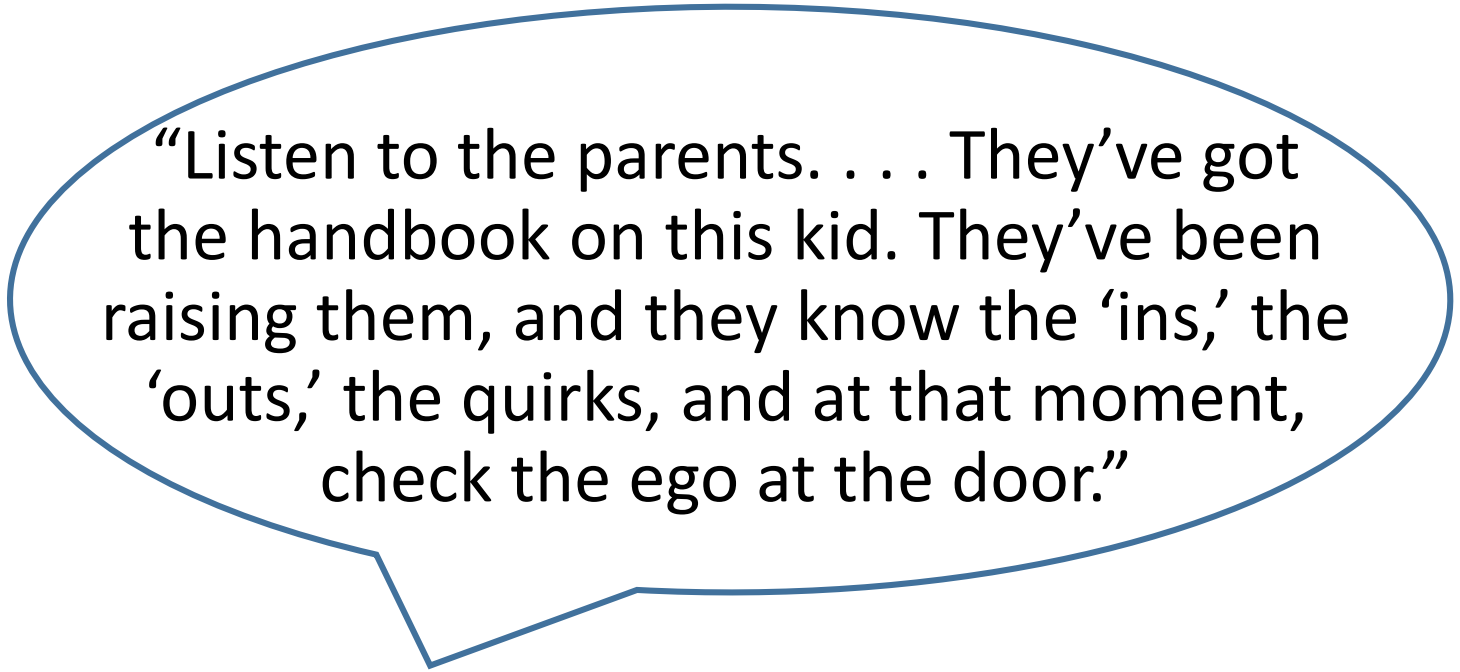
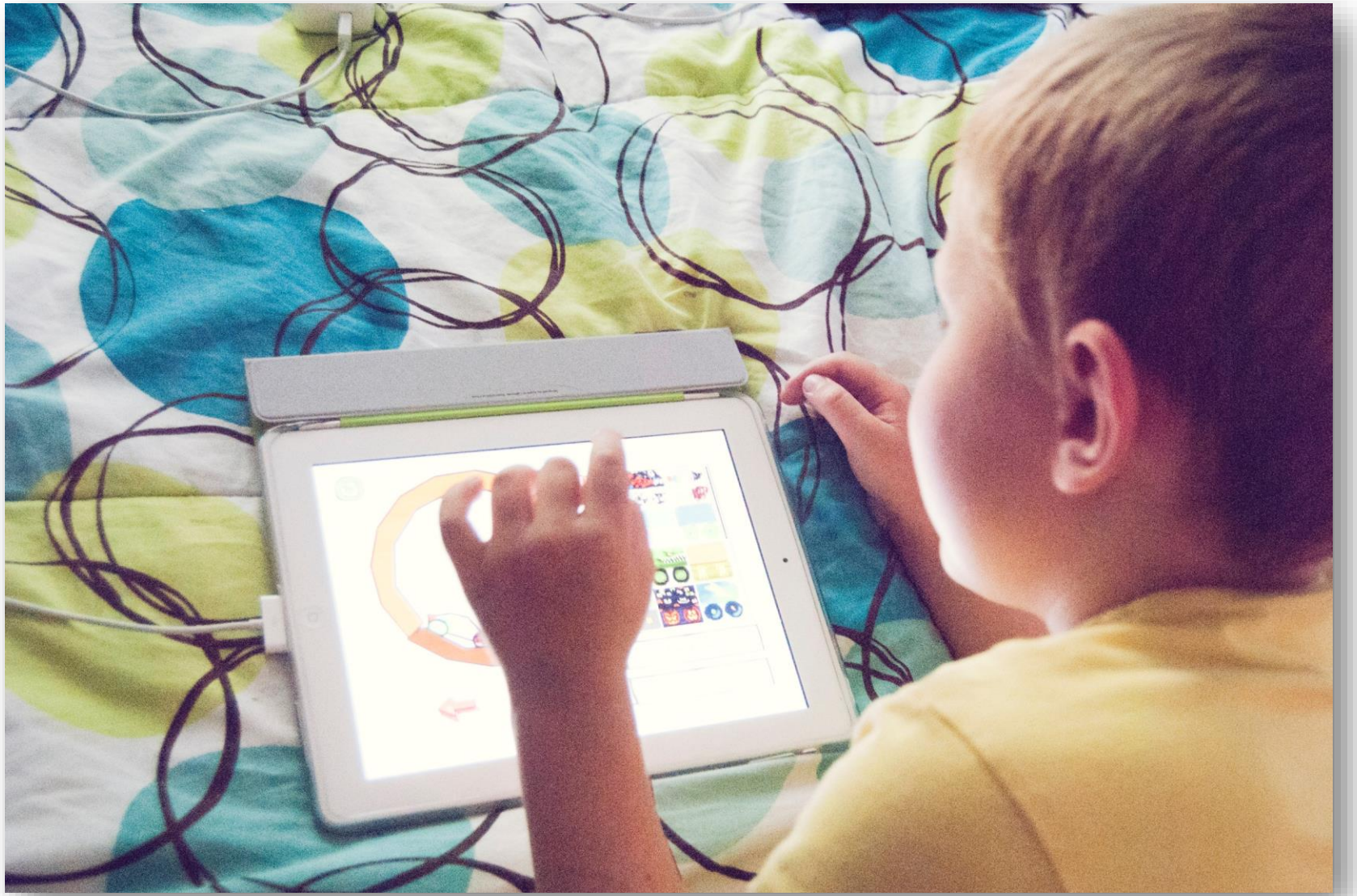
Nicholas DB, Zwaigenbaum L, Muskat B, Craig WR, Newton AS, Kilmer C, Greenblatt A, Roberts W, Cohen-Silver J. Experiences of emergency department care from the perspective of families in which a child has autism spectrum disorder. Soc Work Health Care. 2016 Jul;55(6):409-26.

Recognize parents as partners in care

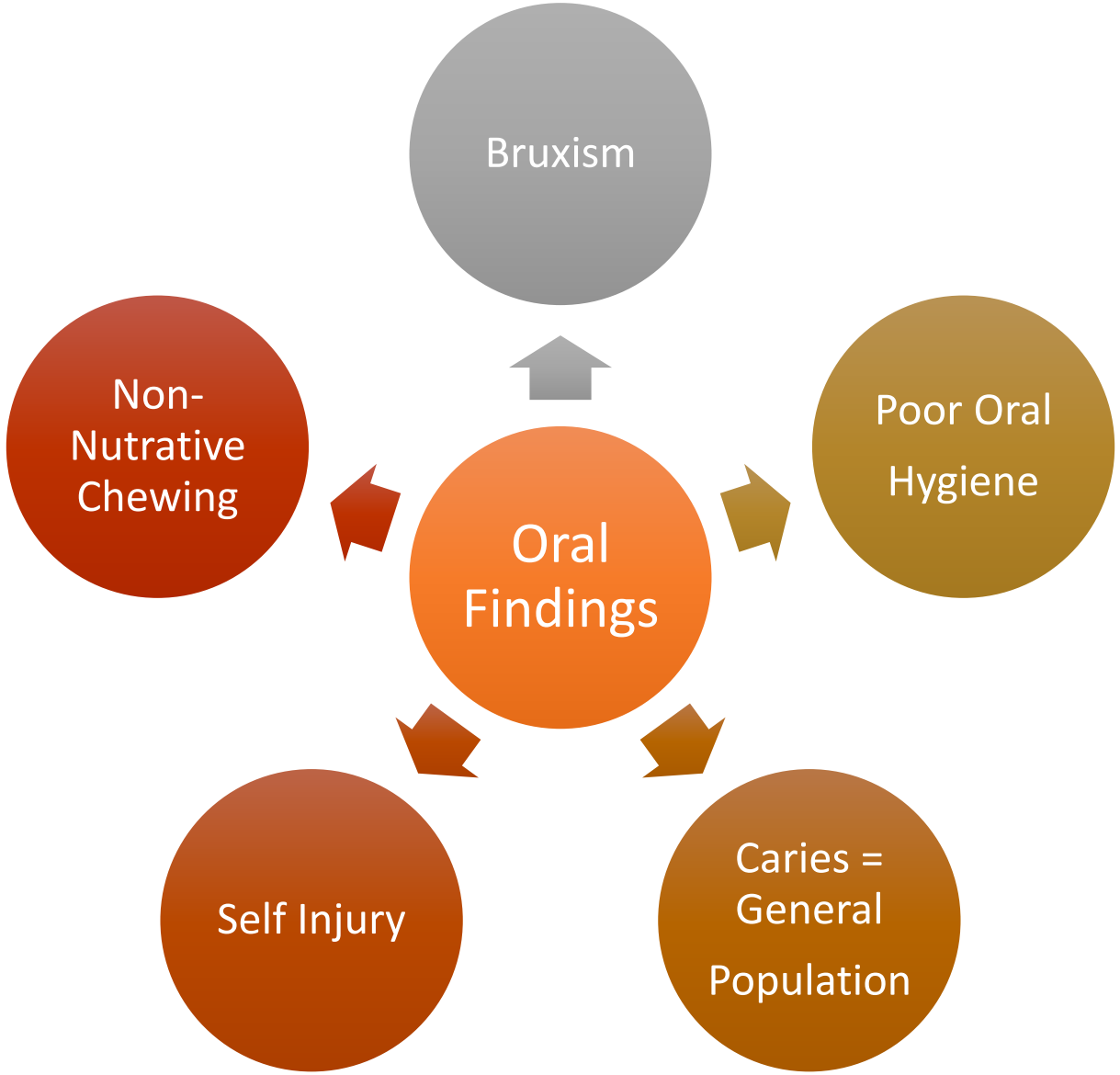


[The nurse's] confidence and arrogance in her training and her ability as a nurse really clouded her judgment. I think it really clouded her ability to see beyond what was really there. I think she's probably a phenomenal nurse . . . but I think that unfortunately hindered her in the situation [of interacting with the child with ASD] because her confidence was so clouding.

“[A staff member] tried to . . . get a doll and give medication to the doll like that would convince him to take the medication. . . . Well that won’t work [because] he doesn’t play pretend.”

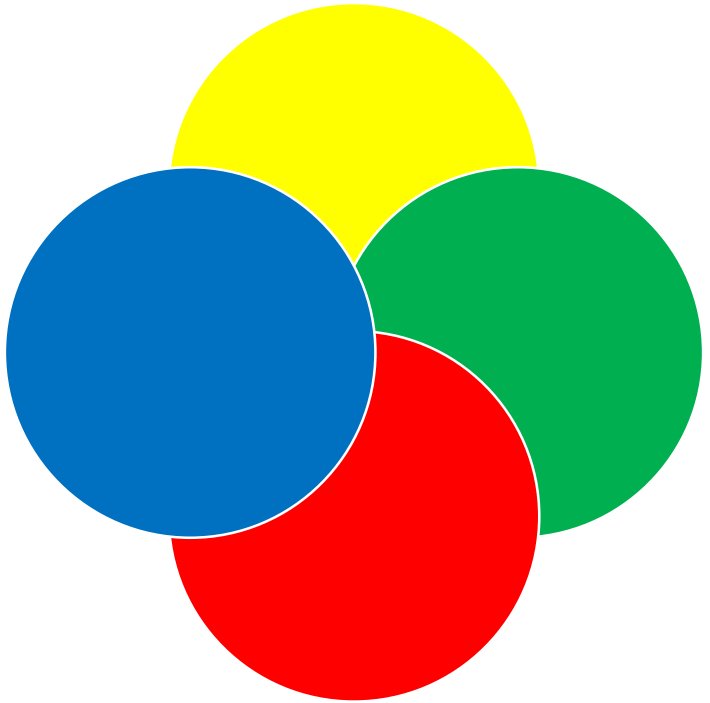


Oral Hygiene and Prevention



AH F, JA Y, VI P, ME M. The neuropathology, medical management and dental implications of autism: J Am Dent Assoc; 2006. p. 1517-27

Controversial Issues in Treating The Dental Patient with Autism



Rada RE. Controversial issues in treating the dental patient with autism. J Am Dent Assoc. United States; 2010. p. 947-53.

Mercury

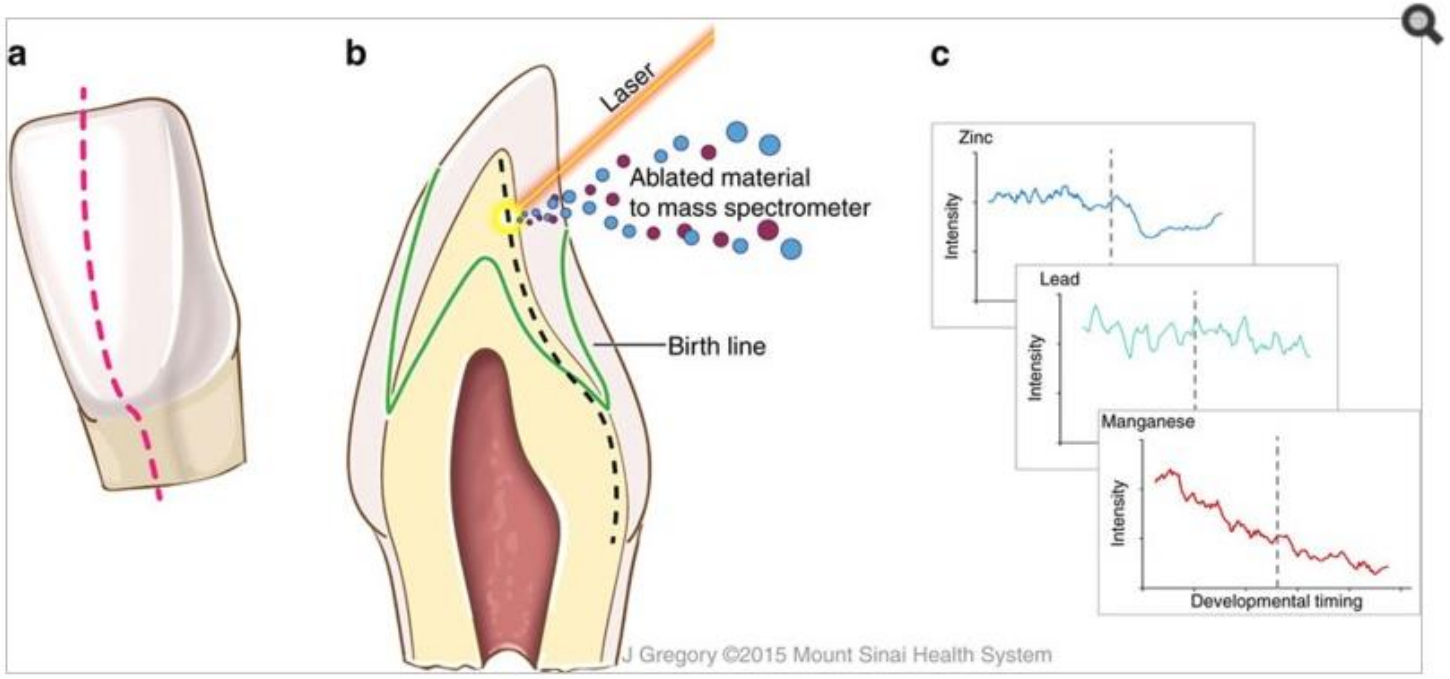
- The alternative medical literature suggests that children with autism are genetically predisposed with the inability to clear the body of heavy metal contaminants like mercury and aluminum

- An unreplicated 2007 study showed higher concentration of mercury in pulps of teeth for children with autism

Rada RE. Controversial issues in treating the dental patient with autism. J Am Dent Assoc. United States; 2010. p. 947-53.

Adams JB, Romdalvik J, Ramanujam VM, Legator MS. Mercury, lead, and zinc in baby teeth of children with autism versus controls. J Toxicol Environ Health A. England; 2007. p. 1046-51.

Fetal and postnatal metal dysregulation in autism



Arora M, Reichenberg A, Willfors C, Austin C, Gennings C, Berggren S, Lichtenstein P, Anckarsäter H, Tammimies K, Bölte S. Fetal and postnatal metal dysregulation in autism. Nat Commun. 2017 Jun 1;8:15493

Fetal and postnatal metal dysregulation in autism

- Swedish monozygotic and dizygotic twins discordant for ASD
- Used validated tooth-matrix biomarkers to estimate pre- and post-natal (to approximately 3 yrs) exposure profiles of essential and toxic elements.
- Significant divergences are apparent in metal uptake between ASD cases and their control siblings, but only during discrete developmental periods.
- Cases have reduced uptake of essential elements manganese and zinc, and higher uptake of the neurotoxin lead.
- Study suggests that metal toxicant uptake and essential element deficiency during specific developmental windows increases ASD risk and severity, supporting the hypothesis of systemic elemental dysregulation in ASD.

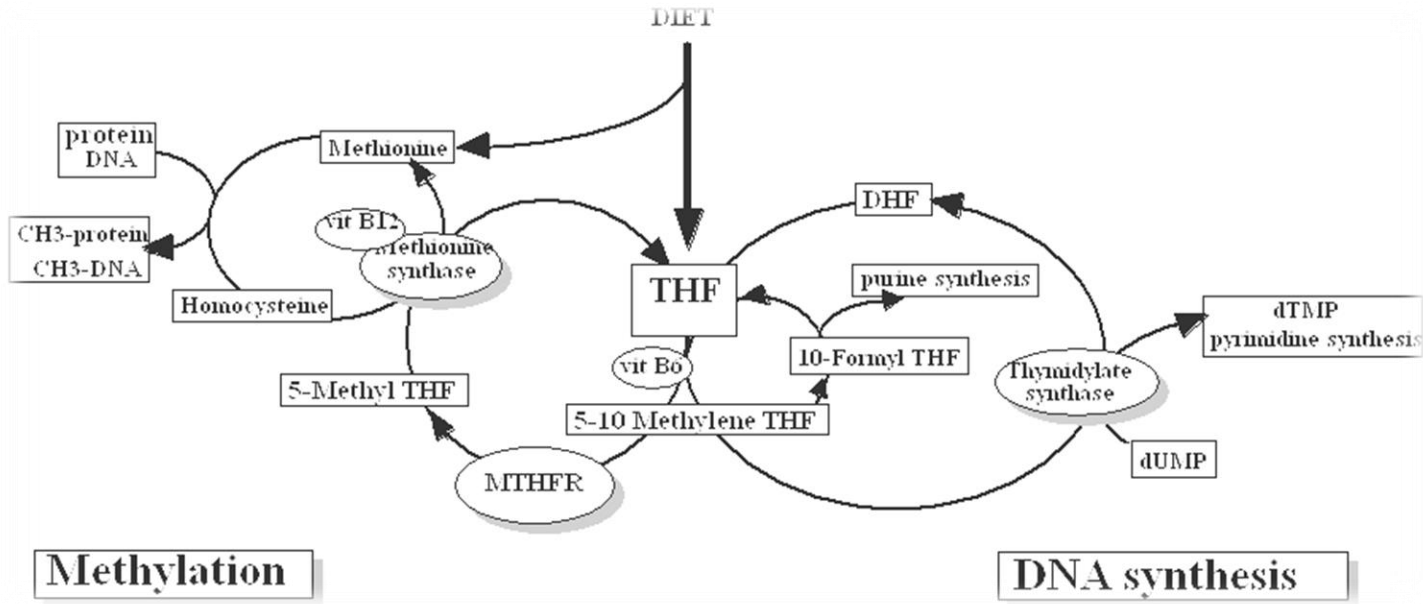
Arora M, Reichenberg A, Willfors C, Austin C, Gennings C, Berggren S, Lichtenstein P, Anckarsäter H, Tammimies K, Bölte S. Fetal and postnatal metal dysregulation in autism. Nat Commun. 2017 Jun 1;8:15493

Fluoride

- In some alternative literature it is suggested that fluoride use be limited in children with autism
- Proponents state that fluoride inhibits critical antioxidant enzymes, contributing to excitotoxic reactions in the brain

Blaylock RL. A possible central mechanism in autism spectrum disorders, part 3: the role of excitotoxin food additives and the synergistic effects of other environmental toxins. Altern Ther Health Med 2009;15(2):56-60.

Nitrous Oxide

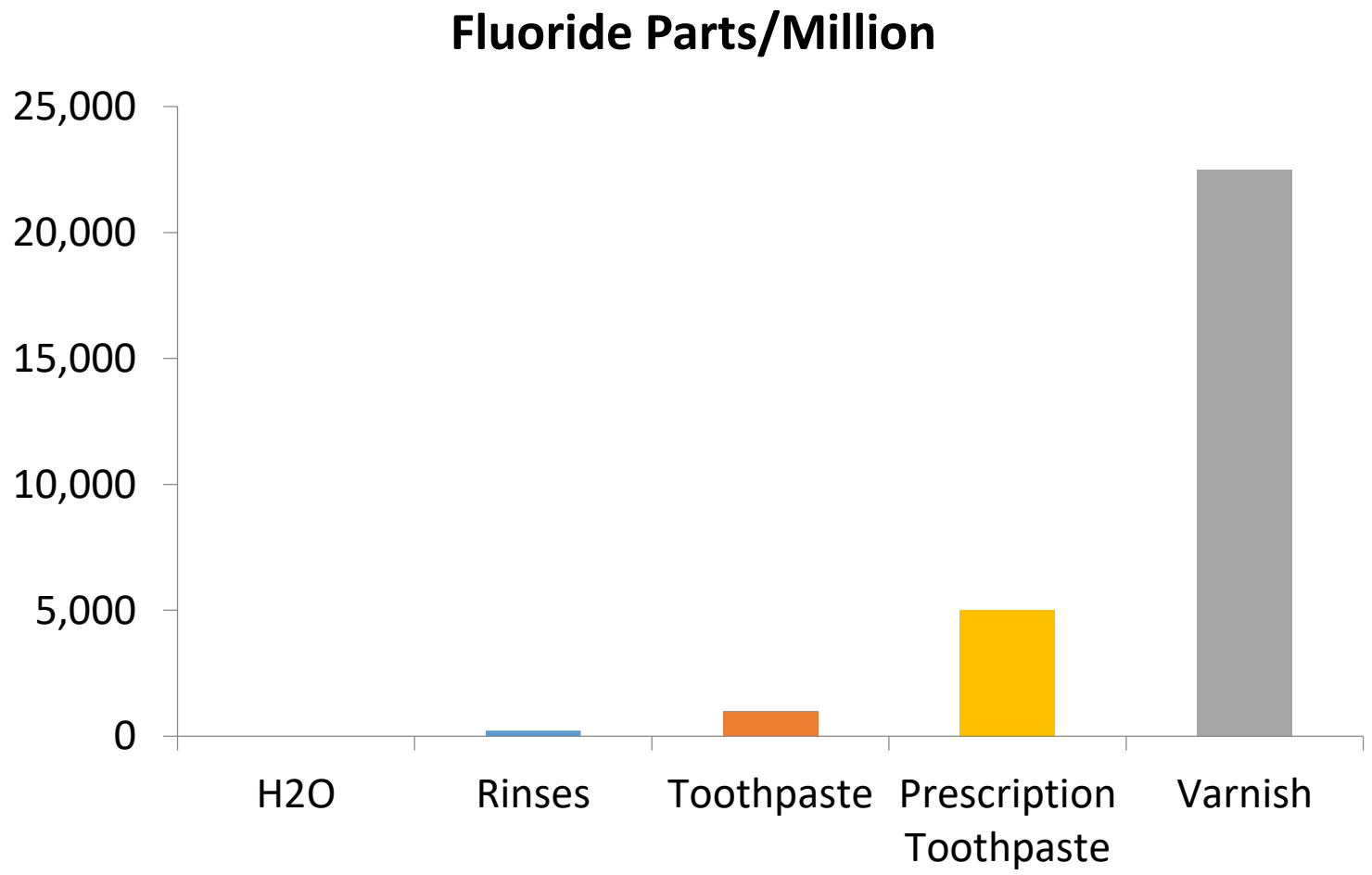


Antibiotics

- Children with autism may be on probiotics or other special diets
- Dentists should be especially judicious in the use of antibiotics so as to not disrupt the intestinal flora in these patients

Kidd PM. Autism, an extreme challenge to integrative medicine. Part 2: medical management. Altern Med Rev 2002;7(6):472-99

Oral Home Care


Fluoride Parts/Million
25,000
20,000
15,000
10,000
5,000
0
H2O
Rinses
Toothpaste
Prescription Toothpaste
Varnish

How Good is OTC Toothpaste?

Caries Research

Original Paper

Caries Res 2002;36:294–300

Received: October 25, 2001
Accepted after revision: March 23, 2002

A Randomised Controlled Trial of the Efficacy of Supervised Toothbrushing in High-Caries-Risk Children

M.M.T. Curnow[a] C.M. Pine[b] G. Burnside[b] J.A. Nicholson[c] R.K. Chesters[c] E. Huntington[c]

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Key Words
Caries prevention · Fluoride toothpaste · Randomised controlled trial · Supervised toothbrushing

Abstract
Scottish children have one of the highest levels of caries experience in Europe. Only 33% of 5-year-old children in Dundee who developed caries in their first permanent molars by 7 brushed their teeth twice a day. High-caries-risk children should benefit if they brush more often with fluoridated toothpaste. The aim of this clinical trial was to determine the reduction in 2-year caries increment that can be achieved by daily supervised toothbrushing on school-days with a toothpaste containing 1,000 ppm fluoride (as sodium monofluorophosphate) and 0.13% calcium glycerophosphate, combined with recommended daily home use, compared to a control group involving no intervention other than 6-monthly clinical examinations. Five hundred and thirty-four children, mean age 5.3, in schools in deprived areas of Tayside were recruited. Each school had two parallel classes, one randomly selected to be the brushing class and the other, the control. Local mothers were trained as toothbrushing supervisors. Children brushed on school-days and received home supplies. A single examiner undertook 6-monthly examinations recording plaque, caries (D_1 level), and used FOTI to supplement the visual caries examination. For children in the brushing classes, the 2-year mean caries increment on first permanent molars was 0.81 at D_1 and 0.21 at D_3 compared to 1.19 and 0.48 for children in the control classes (significant reductions of 32% at D_1 and 56% at D_3). In conclusion, high-caries-risk children have been shown to have significantly less caries after participating in a supervised toothbrushing programme with a fluoridated toothpaste.

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Dental caries remains one of the most common childhood diseases in the world. Though the overall prevalence has declined in Europe, the distribution pattern has changed with about 20% of children now having 80% of the total reported level of tooth decay [Marthaler, 1990; Marthaler et al., 1996]. These high-caries-risk children have been shown to live in more materially deprived neighbourhoods, tend to have parents with lower educational levels, have diets high in sugary foods and drinks,

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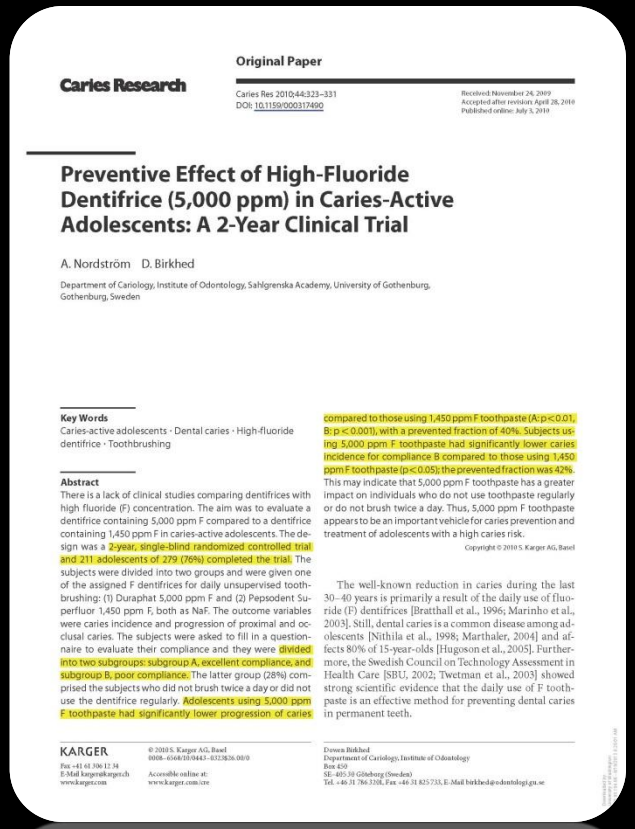
Brushing reduced decay by
over 50%

How Good is Prescription Strength Toothpaste?



Caries Research

Original Paper

Caries Res 2010;44:323–331
DOI: 10.1159/000317490

Received: November 24, 2009
Accepted after revision: April 28, 2010
Published online: July 3, 2010

Preventive Effect of High-Fluoride Dentifrice (5,000 ppm) in Caries-Active Adolescents: A 2-Year Clinical Trial

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Department of Cariology, Institute of Odontology, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden

Key Words
Caries-active adolescents · Dental caries · High-fluoride dentifrice · Toothbrushing

Abstract
There is a lack of clinical studies comparing dentifrices with high fluoride (F) concentration. The aim was to evaluate a dentifrice containing 5,000 ppm F compared to a dentifrice containing 1,450 ppm F in caries-active adolescents. The design was a 2-year, single-blind randomized controlled trial and 211 adolescents of 279 (76%) completed the trial. The subjects were divided into two groups and were given one of the assigned F dentifrices for daily unsupervised toothbrushing: (1) Duraphat 5,000 ppm F and (2) Pepsodent Superfluor 1,450 ppm F, both as NaF. The outcome variables were caries incidence and progression of proximal and occlusal caries. The subjects were asked to fill in a questionnaire to evaluate their compliance and they were divided into two subgroups: subgroup A, excellent compliance, and subgroup B, poor compliance. The latter group (28%) comprised the subjects who did not brush twice a day or did not use the dentifrice regularly. Adolescents using 5,000 ppm F toothpaste had significantly lower progression of caries compared to those using 1,450 ppm F toothpaste (A: $p < 0.01$, B: $p < 0.001$), with a prevented fraction of 40%. Subjects using 5,000 ppm F toothpaste had significantly lower caries incidence for compliance B compared to those using 1,450 ppm F toothpaste ($p < 0.05$); the prevented fraction was 42%. This may indicate that 5,000 ppm F toothpaste has a greater impact on individuals who do not use toothpaste regularly or do not brush twice a day. Thus, 5,000 ppm F toothpaste appears to be an important vehicle for caries prevention and treatment of adolescents with a high caries risk.

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The well-known reduction in caries during the last 30–40 years is primarily a result of the daily use of fluoride (F) dentifrices [Bratthall et al., 1996; Marinho et al., 2003]. Still, dental caries is a common disease among adolescents [Nithila et al., 1998; Marthaler, 2004] and affects 80% of 15-year-olds [Hugoson et al., 2005]. Furthermore, the Swedish Council on Technology Assessment in Health Care [SBU, 2002; Twetman et al., 2003] showed strong scientific evidence that the daily use of F toothpaste is an effective method for preventing dental caries in permanent teeth.

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5000 PPM toothpaste reduced decay by 42%

C P, B B. Teaching oral hygiene to children with autism: Int J Paediatr Dent; 2005. p. 312-17.

Brushing and Flossing
Visual Sequencing Cards

Instructions: Cut out cards along the lines. Place the cards in order and show your child each step of brushing and flossing his or her teeth. Place the cards on a board, mirror, or ledge. Remove each step once it is completed. Use these visual aids each time your child brushes and flosses.

I get my toothbrush.

I get my toothpaste.

I take off the cap and squeeze a pea-size amount of toothpaste onto my toothbrush.

I brush the front of my teeth gently using a circle motion.

I brush the front of my teeth gently using a circle motion.

I brush the inside part of my teeth.

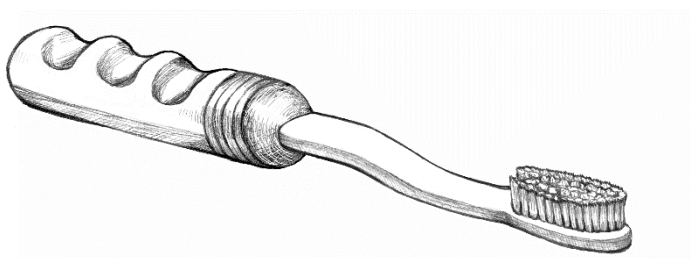
I brush the inside part of my teeth.

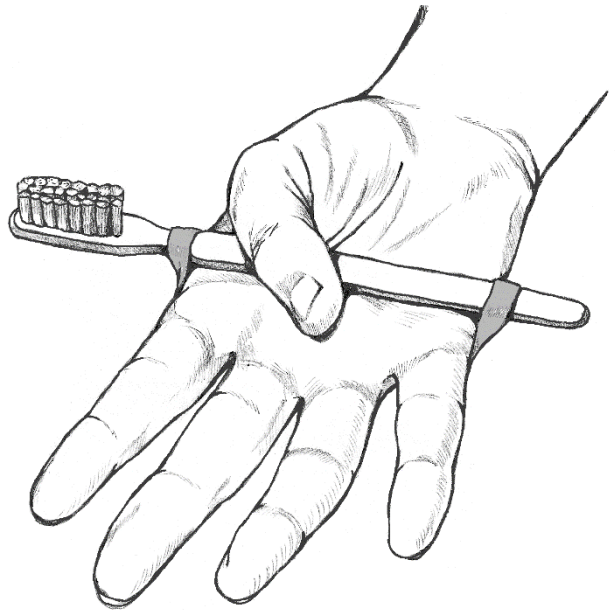
Timers

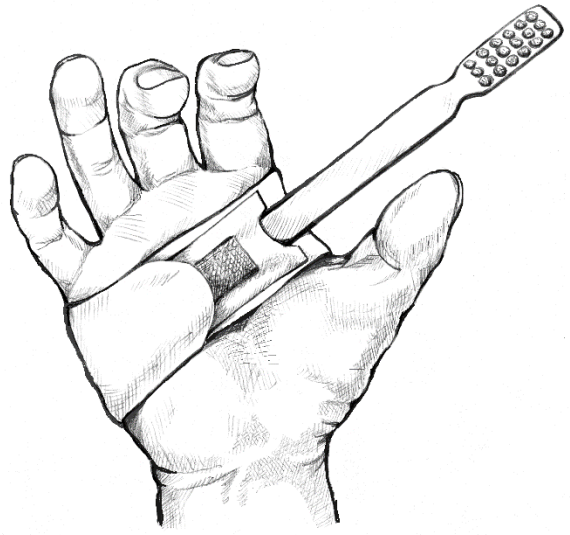
FREE APP
Introducing the FREE
Disney Magic Timer app by Oral-B.
With the FREE Disney Magic Timer app by Oral-B, powered by DREAMPLAY,
you can bring Disney and Marvel characters to life and help even the
most reluctant little ones brush longer. To unlock the fun, all you need is
a Crest or Oral-B Pro-Health Stages product.
Download on the App Store
GET IT ON Google play
Disney
MARVEL
MAGIC TIMER
by Oral-B
Crest
PRO-HEALTH Stages

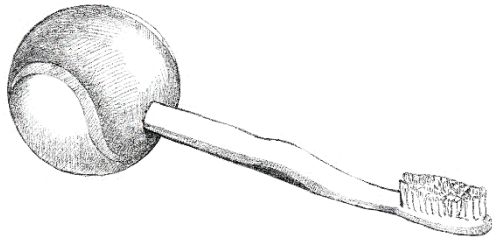
Picking the Right Toothbrush

Making Toothbrushes Work for the Patient









Other Oral Hygiene Devices

Picking the Right Toothpaste

#1 DENTIST RECOMMENDED
FLUORIDE BRAND†
alcohol free
NEW BOTTLE!
ACT
Kids
Anticavity
FLUORIDE RINSE
BUBBLEGUM BLOWOUT®
SWISH AWAY PARTICLES
brushing may miss
Helps PREVENT CAVITIES
Sodium Fluoride 0.05%
IMPORTANT: Read directions for proper use.
16.9 fl oz (500 mL)

Positions to Facilitate Home Oral Hygiene

Positions to Facilitate Home Oral Hygiene

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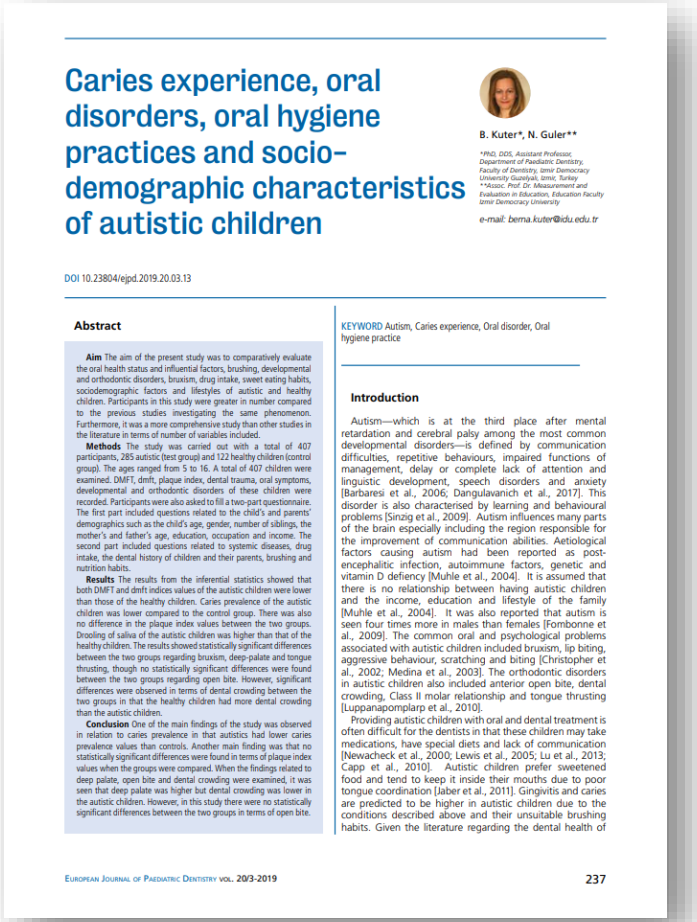
Positions to Facilitate Home Oral Hygiene

Positions to Facilitate Home Oral Hygiene

- 285 children with ASD, 122 neurotypical-ages 5-16 yrs
- Oral examination and questionnaires
- Higher % of systemic diseases in ASD population (24%)
- 72.6% of patients with ASD on medication



Caries experience, oral disorders, oral hygiene practices and socio-demographic characteristics of autistic children

B. Kuter*, N. Guler**

*PhD, DDS, Assistant Professor, Department of Paediatric Dentistry, Faculty of Dentistry, Izmir Democracy University Guzelyali, Izmir, Turkey
**Assoc. Prof. Dr. Measurement and Evaluation in Education, Education Faculty Izmir Democracy University

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DOI 10.23804/ejpd.2019.20.03.13

Abstract

Aim The aim of the present study was to comparatively evaluate the oral health status and influential factors, brushing, developmental and orthodontic disorders, bruxism, drug intake, sweet eating habits, sociodemographic factors and lifestyles of autistic and healthy children. Participants in this study were greater in number compared to the previous studies investigating the same phenomenon. Furthermore, it was a more comprehensive study than other studies in the literature in terms of number of variables included.

Methods The study was carried out with a total of 407 participants, 285 autistic (test group) and 122 healthy children (control group). The ages ranged from 5 to 16. A total of 407 children were examined. DMFT, dmft, plaque index, dental trauma, oral symptoms, developmental and orthodontic disorders of these children were recorded. Participants were also asked to fill a two-part questionnaire. The first part included questions related to the child's and parents' demographics such as the child's age, gender, number of siblings, the mother's and father's age, education, occupation and income. The second part included questions related to systemic diseases, drug intake, the dental history of children and their parents, brushing and nutrition habits.

Results The results from the inferential statistics showed that both DMFT and dmft indices values of the autistic children were lower than those of the healthy children. Caries prevalence of the autistic children was lower compared to the control group. There was also no difference in the plaque index values between the two groups. Drooling of saliva of the autistic children was higher than that of the healthy children. The results showed statistically significant differences between the two groups regarding bruxism, deep-palate and tongue thrusting, though no statistically significant differences were found between the two groups regarding open bite. However, significant differences were observed in terms of dental crowding between the two groups in that the healthy children had more dental crowding than the autistic children.

Conclusion One of the main findings of the study was observed in relation to caries prevalence in that autistics had lower caries prevalence values than controls. Another main finding was that no statistically significant differences were found in terms of plaque index values when the groups were compared. When the findings related to deep palate, open bite and dental crowding were examined, it was seen that deep palate was higher but dental crowding was lower in the autistic children. However, in this study there were no statistically significant differences between the two groups in terms of open bite.

KEYWORD Autism, Caries experience, Oral disorder, Oral hygiene practice

Introduction

Autism—which is at the third place after mental retardation and cerebral palsy among the most common developmental disorders—is defined by communication difficulties, repetitive behaviours, impaired functions of management, delay or complete lack of attention and linguistic development, speech disorders and anxiety [Barbaresi et al., 2006; Dangulavanich et al., 2017]. This disorder is also characterised by learning and behavioural problems [Sinzig et al., 2009]. Autism influences many parts of the brain especially including the region responsible for the improvement of communication abilities. Aetiological factors causing autism had been reported as post-encephalitic infection, autoimmune factors, genetic and vitamin D defiency [Muhle et al., 2004]. It is assumed that there is no relationship between having autistic children and the income, education and lifestyle of the family [Muhle et al., 2004]. It was also reported that autism is seen four times more in males than females [Fombonne et al., 2009]. The common oral and psychological problems associated with autistic children included bruxism, lip biting, aggressive behaviour, scratching and biting [Christopher et al., 2002; Medina et al., 2003]. The orthodontic disorders in autistic children also included anterior open bite, dental crowding, Class II molar relationship and tongue thrusting [Luppanapornlarp et al., 2010].

Providing autistic children with oral and dental treatment is often difficult for the dentists in that these children may take medications, have special diets and lack of communication [Newacheck et al., 2000; Lewis et al., 2005; Lu et al., 2013; Capp et al., 2010]. Autistic children prefer sweetened food and tend to keep it inside their mouths due to poor tongue coordination [Jaber et al., 2011]. Gingivitis and caries are predicted to be higher in autistic children due to the conditions described above and their unsuitable brushing habits. Given the literature regarding the dental health of

Kuter B, Guler N. Caries experience, oral disorders, oral hygiene practices and socio-demographic characteristics of autistic children. Eur J Paediatr Dent. 2019 Sep;20(3):237-241.

In Patients with ASD

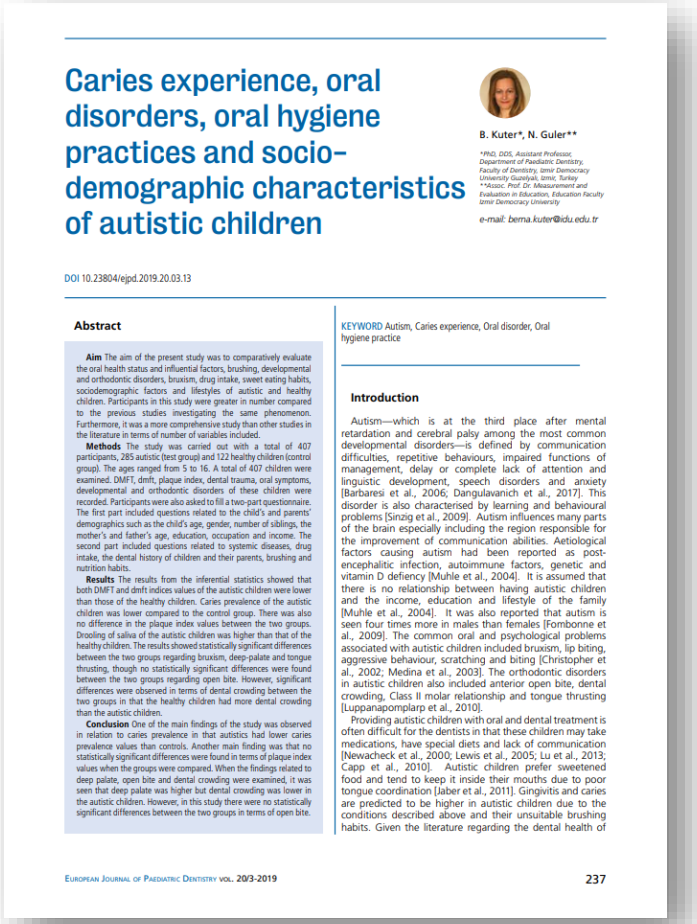
<u>Significantly Greater:</u>

- Self Injury (35% vs 5%)
- Caregiver brushing teeth (80% vs 9%)
- Tooth wear (31% vs 6%)

<u>Significantly Lower:</u>

- Caries prevalence (0.5-2 vs 1-3 DMFT/dmft)

*No difference in plaque index



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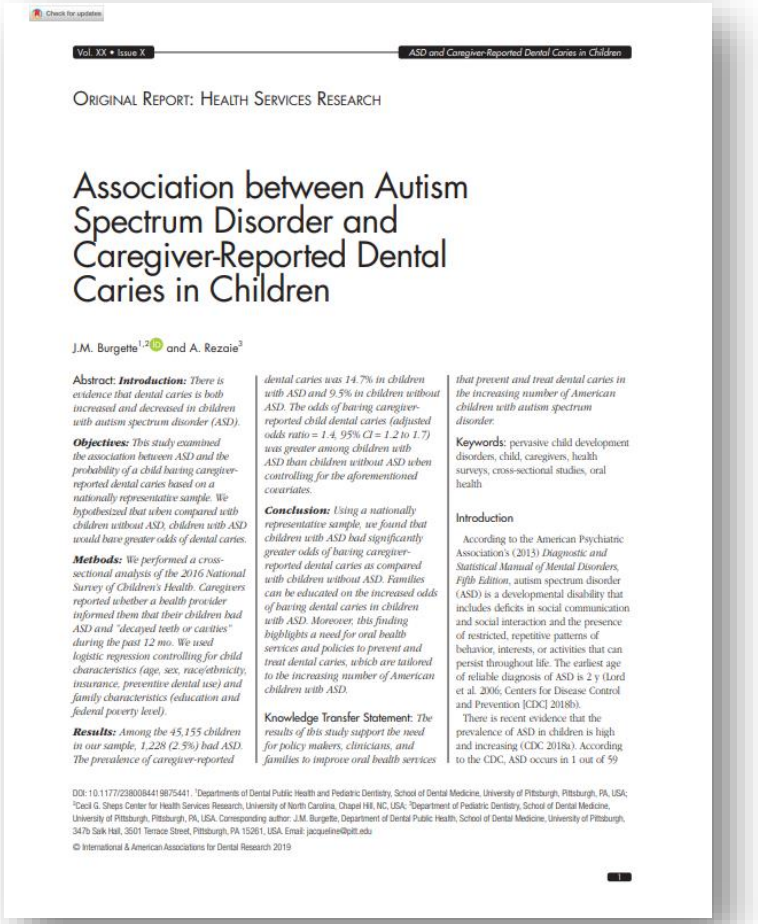
- 2016 National Survey of Children's Health Data: 45,000 questionnaires
- Children with ASD 1.4 times the odds of caregiver-reported caries compared with children without ASD



ORIGINAL REPORT: HEALTH SERVICES RESEARCH

Association between Autism Spectrum Disorder and Caregiver-Reported Dental Caries in Children

J.M. Burgette[1,2] and A. Rezaie[3]

Abstract: ***Introduction:*** *There is evidence that dental caries is both increased and decreased in children with autism spectrum disorder (ASD).*

Objectives: *This study examined the association between ASD and the probability of a child having caregiver-reported dental caries based on a nationally representative sample. We hypothesized that when compared with children without ASD, children with ASD would have greater odds of dental caries.*

Methods: *We performed a cross-sectional analysis of the 2016 National Survey of Children's Health. Caregivers reported whether a health provider informed them that their children had ASD and "decayed teeth or cavities" during the past 12 mo. We used logistic regression controlling for child characteristics (age, sex, race/ethnicity, insurance, preventive dental use) and family characteristics (education and federal poverty level).*

Results: *Among the 45,155 children in our sample, 1,228 (2.5%) had ASD. The prevalence of caregiver-reported dental caries was 14.7% in children with ASD and 9.5% in children without ASD. The odds of having caregiver-reported child dental caries (adjusted odds ratio = 1.4, 95% CI = 1.2 to 1.7) was greater among children with ASD than children without ASD when controlling for the aforementioned covariates.*

Conclusion: *Using a nationally representative sample, we found that children with ASD had significantly greater odds of having caregiver-reported dental caries as compared with children without ASD. Families can be educated on the increased odds of having dental caries in children with ASD. Moreover, this finding highlights a need for oral health services and policies to prevent and treat dental caries, which are tailored to the increasing number of American children with ASD.*

Knowledge Transfer Statement: *The results of this study support the need for policy makers, clinicians, and families to improve oral health services that prevent and treat dental caries in the increasing number of American children with autism spectrum disorder.*

Keywords: pervasive child development disorders, child, caregivers, health surveys, cross-sectional studies, oral health

Introduction

According to the American Psychiatric Association's (2013) *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*, autism spectrum disorder (ASD) is a developmental disability that includes deficits in social communication and social interaction and the presence of restricted, repetitive patterns of behavior, interests, or activities that can persist throughout life. The earliest age of reliable diagnosis of ASD is 2 y (Lord et al. 2006; Centers for Disease Control and Prevention [CDC] 2018b).

There is recent evidence that the prevalence of ASD in children is high and increasing (CDC 2018a). According to the CDC, ASD occurs in 1 out of 59

DOI: 10.1177/2380084419875441. [1]Departments of Dental Public Health and Pediatric Dentistry, School of Dental Medicine, University of Pittsburgh, Pittsburgh, PA, USA; [2]Cecil G. Sheps Center for Health Services Research, University of North Carolina, Chapel Hill, NC, USA; [3]Department of Pediatric Dentistry, School of Dental Medicine, University of Pittsburgh, Pittsburgh, PA, USA. Corresponding author: J.M. Burgette, Department of Dental Public Health, School of Dental Medicine, University of Pittsburgh, 347b Salk Hall, 3501 Terrace Street, Pittsburgh, PA 15261, USA. Email: jacqueline@pitt.edu

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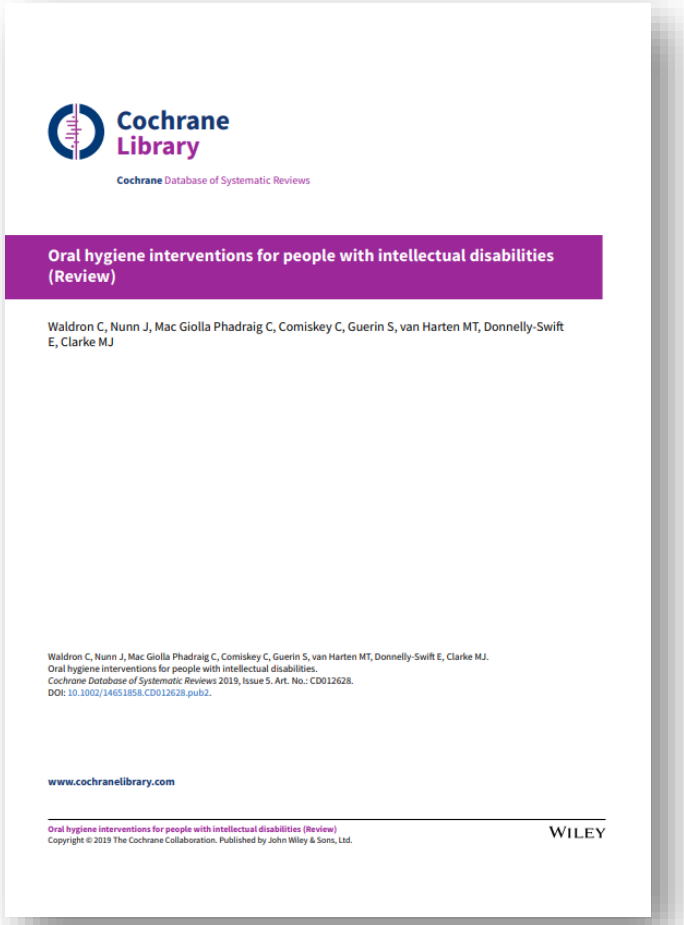
Burgette JM, Rezaie A. Association between Autism Spectrum Disorder and Caregiver-Reported Dental Caries in Children. JDR Clin Trans Res. 2019 Sep 6

Does Type of Toothbrush Make a Difference?

- Systematic review, including 19 RCTs and 5 nonrandomized studies
- 1795 adults and children wth ID + 354 caregivers
- No apparent difference in gingival inflammation or plaque removal between manual and electric brushes
- <u>Providers should consider individual circumstances when recommending manual vs power brushes</u>



Waldron C, Nunn J, Mac Giolla Phadraig C, Comiskey C, Guerin S, van Harten MT, Donnelly-Swift E, Clarke MJ. Oral hygiene interventions for people with intellectual disabilities. Cochrane Database Syst Rev. 2019 May 31;5

Dental Caries Varies Among Subgroups of Children with Special Health Care Needs

Retrospective longitudinal cohort of 150 patients

- ASD
- Cerebral palsy
- Congenital heart disease
- Down syndrome
- Controls

PEDIATRIC DENTISTRY V 41 / NO 5 SEP / OCT 19

COHORT STUDY

Dental Caries Risk Varies Among Subgroups of Children with Special Health Care Needs

Molly Frank, DDS, MS[1] • Martha Ann Keels, DDS, PhD[2] • Rocio Quiñonez, DMD, MS, MPH[3] • Michael Roberts, DDS, MScD[4] • Kimon Divaris, DDS, PhD[5]

Abstract: ***Purpose:*** *Currently, caries risk assessment tools consider all children with special health care needs in tandem. The purpose of this study was to test this assumption by examining caries risk among and within five distinct groups of children, most with special health care needs (CSHCN): (1) autism (ASD); (2) congenital heart disease (CHD); (3) cerebral palsy (CP); (4) Down syndrome (DS); and (5) a control (non-CSHCN) group.* ***Methods:*** *A retrospective longitudinal cohort of 150 patients (30 per group) from a private pediatric dental practice was assembled, and information on caries diagnoses and 21 postulated caries risk factors from clinical records was extracted. Bivariate tests and multivariable Poisson regression modeling were used to estimate the caries incidence rate (IR), ratio (IRR), and 95 percent confidence interval (CI).* ***Results:*** *CSHCN had a higher caries burden and caries risk (IR equals 0.049 per person per year) compared to the control group (IR equals 0.033). Caries risk was nearly double among CHD (IRR equals 1.9 [95 percent CI equals 0.72 to 5.2] versus controls) compared to DS (IRR equals 1.04 [95 percent CI equals 0.38 to 2.9]). Visible cavities or fillings was the only significant risk factor, yet it did not alter the between-CSHCN group (i.e., CHD greater than DS, controls) caries risk heterogeneity.* ***Conclusions:*** *Children with special health care needs comprise a heterogeneous group that must be treated in a precise, diagnosis-specific manner in caries risk assessment. Caries experience in the primary dentition was the only significant predictor of permanent dentition caries incidence.* *(Pediatr Dent 2019;41(5):378-84) Received January 15, 2019 / Last Revision June 12, 2019 / Accepted June 13, 2019*

KEYWORDS: DENTAL CARIES, CARIES RISK, CHILDREN, SPECIAL HEALTH CARE NEEDS, HETEROGENEITY

The American Academy of Pediatric Dentistry (**AAPD**) regards all caries risk assessment tools as "essential element(s) of contemporary clinical care for infants, children, and adolescents."[1] The goal of risk assessment is to aid dentists in individualizing preventive strategies, determining recall intervals, and allocating resources in a way that best addresses patients' needs. Importantly, caries risk assessment tools have important pedagogical value and are useful for patient education and communication purposes, especially in the context of addressing modifiable risk factors.

The emerging new paradigms of precision medicine[2,3] and dentistry[4] place increased demands on caries risk assessment approaches. For example, identification of (biological, clinical, or composite) subtypes of previously considered homogeneous disease entities and emphasis on care customization are two important elements of precision health care. The practical utility of current caries risk assessment tools is arguably limited.[5,6] This is due to several reasons, including the general lack of validation studies and, thus, quantitative estimates of risk (versus the subjective low/moderate/high categories), the inclusion of current disease markers as risk factors, an overall lack of scientific evidence support, and others.

The consideration of all children with special health care needs (**CSHCN**) as one homogeneous category for caries risk assessment is a prime example area where improvements are warranted. Existing caries risk assessment tools by the AAPD, American Dental Association (**ADA**), and Caries Management by Risk Assessment (**CAMBRA**) consider all CSHCN in tandem, disregarding their actual diagnoses and their implications.[1,7-10] According to the AAPD tool, all CSHCN are categorized as moderate risk.[1] The ADA tool places all special health care needs patients under 14 years of age into the high risk category, while those over age 14 are categorized as moderate risk.[7,8] CAMBRA classifies children younger than five years old with "developmental problems" as high risk, while special health care needs (**SHCN**) status is not considered for individuals over six years of age. If, however, a patient is classified as high risk and has reduced salivary flow or SHCN, they are placed into a separate extreme risk category.[9,10] Of note, it remains unclear exactly what moderate, high, and extreme risk means from a quantitative standpoint (e.g., what is the likelihood of disease development over the next 12 to 24 months).

CSHCN represent an important population segment; according to a 2009 national survey, they comprise 15.5 percent of all children in the United States.[11] In 2010, Iida et al.[12] found that CSHCN were more likely to have unmet dental needs and lack preventive dental services compared to their non-CSHCN counterparts. The reasons behind this phenomenon are not fully understood, but the authors concluded that the heterogeneity in the complexity of CSHCN, in fact, leads to differences in dental service utilization. In another recent study, Craig et al. found support for an influence of socioeconomic status on patterns of preventive dental services utilization.[13]

[1]*Dr. Frank is in private practice, Charlotte, N.C.; and a graduate student, Department of Pediatric Dentistry, Adams School of Dentistry, at the University of North Carolina at Chapel Hill, Chapel Hill, N.C., USA.* [2]*Dr. Keels is an adjunct professor,* [3]*Dr. Roberts is a distinguished professor, and* [4]*Dr. Quiñonez is a professor and an associate dean, all in the Department of Pediatric Dentistry, Adams School of Dentistry; and* [5]*Dr. Divaris is an associate professor, Department of Pediatric Dentistry, at the Adams School of Dentistry, and an associate professor, Department of Epidemiology, at the Gillings School of Public Health, all at the University of North Carolina at Chapel Hill, Chapel Hill, N.C., USA.*
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Dental Caries Varies Among Subgroups of Children with Special Health Care Needs

- More frequent between-meal sugar-containing snacks and beverages in CSHCN than controls (CHD 47% vs 10% control)
- Difficulty in performing oral hygiene (DS 40% vs 3% control)
- Greater # of restorations/cavities (CHD 73% vs 27% controls)
- More likely to be receiving xerostomia-inducing medications

PEDIATRIC DENTISTRY V 41 / NO 5 SEP / OCT 19

COHORT STUDY

Dental Caries Risk Varies Among Subgroups of Children with Special Health Care Needs

Molly Frank, DDS, MS[1] • Martha Ann Keels, DDS, PhD[2] • Rocio Quiñonez, DMD, MS, MPH[3] • Michael Roberts, DDS, MScD[4] • Kimon Divaris, DDS, PhD[5]

Abstract: ***Purpose:*** *Currently, caries risk assessment tools consider all children with special health care needs in tandem. The purpose of this study was to test this assumption by examining caries risk among and within five distinct groups of children, most with special health care needs (CSHCN): (1) autism (ASD); (2) congenital heart disease (CHD); (3) cerebral palsy (CP); (4) Down syndrome (DS); and (5) a control (non-CSHCN) group.* ***Methods:*** *A retrospective longitudinal cohort of 150 patients (30 per group) from a private pediatric dental practice was assembled, and information on caries diagnoses and 21 postulated caries risk factors from clinical records was extracted. Bivariate tests and multivariable Poisson regression modeling were used to estimate the caries incidence rate (IR), ratio (IRR), and 95 percent confidence interval (CI).* ***Results:*** *CSHCN had a higher caries burden and caries risk (IR equals 0.049 per person per year) compared to the control group (IR equals 0.033). Caries risk was nearly double among CHD (IRR equals 1.9 [95 percent CI equals 0.72 to 5.2] versus controls) compared to DS (IRR equals 1.04 [95 percent CI equals 0.38 to 2.9]). Visible cavities or fillings was the only significant risk factor, yet it did not alter the between-CSHCN group (i.e., CHD greater than DS, controls) caries risk heterogeneity.* ***Conclusions:*** *Children with special health care needs comprise a heterogeneous group that must be treated in a precise, diagnosis-specific manner in caries risk assessment. Caries experience in the primary dentition was the only significant predictor of permanent dentition caries incidence.* *(Pediatr Dent 2019;41(5):378-84) Received January 15, 2019 / Last Revision June 12, 2019 / Accepted June 13, 2019*

KEYWORDS: DENTAL CARIES, CARIES RISK, CHILDREN, SPECIAL HEALTH CARE NEEDS, HETEROGENEITY

The American Academy of Pediatric Dentistry (**AAPD**) regards all caries risk assessment tools as "essential element(s) of contemporary clinical care for infants, children, and adolescents."[1] The goal of risk assessment is to aid dentists in individualizing preventive strategies, determining recall intervals, and allocating resources in a way that best addresses patients' needs. Importantly, caries risk assessment tools have important pedagogical value and are useful for patient education and communication purposes, especially in the context of addressing modifiable risk factors.

The emerging new paradigms of precision medicine[2,3] and dentistry[4] place increased demands on caries risk assessment approaches. For example, identification of (biological, clinical, or composite) subtypes of previously considered homogeneous disease entities and emphasis on care customization are two important elements of precision health care. The practical utility of current caries risk assessment tools is arguably limited.[5,6] This is due to several reasons, including the general lack of validation studies and, thus, quantitative estimates of risk (versus the subjective low/moderate/high categories), the inclusion of current disease markers as risk factors, an overall lack of scientific evidence support, and others.

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CSHCN represent an important population segment; according to a 2009 national survey, they comprise 15.5 percent of all children in the United States.[11] In 2010, Iida et al.[12] found that CSHCN were more likely to have unmet dental needs and lack preventive dental services compared to their non-CSHCN counterparts. The reasons behind this phenomenon are not fully understood, but the authors concluded that the heterogeneity in the complexity of CSHCN, in fact, leads to differences in dental service utilization. In another recent study, Craig et al. found support for an influence of socioeconomic status on patterns of preventive dental services utilization.[13]

[1]*Dr. Frank is in private practice, Charlotte, N.C.; and a graduate student, Department of Pediatric Dentistry, Adams School of Dentistry, at the University of North Carolina at Chapel Hill, Chapel Hill, N.C., USA.* [2]*Dr. Keels is an adjunct professor,* [3]*Dr. Roberts is a distinguished professor, and* [4]*Dr. Quiñonez is a professor and an associate dean, all in the Department of Pediatric Dentistry, Adams School of Dentistry; and* [5]*Dr. Divaris is an associate professor, Department of Pediatric Dentistry, at the Adams School of Dentistry, and an associate professor, Department of Epidemiology, at the Gillings School of Public Health, all at the University of North Carolina at Chapel Hill, Chapel Hill, N.C., USA.*
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Dental Caries Varies Among Subgroups of Children with Special Health Care Needs

- Caries burden was highest among children with CHD, followed by ASD and CP
- Children with DS had rates similar to controls

Table 2. DENTAL CARIES BURDEN (DECAYED, MISSING, AND FILLED PRIMARY [dmfs] AND PERMANENT [DMFS] TOOTH SURFACE INDICES) ASSESSED AT THE FIRST VISIT FOR EACH OF THE 150 PATIENTS INCLUDED IN THE RETROSPECTIVE COHORT STUDY

Group †	Children 6-71 months old						Children >71 months old					
	Age (years)			dmfs		ANOVA*	Age (years)			DMFS		ANOVA*
	N	Median (range)	Mean±(SD)	Median (range)	Mean±(SD)	P_1=0.02 P_2=0.02	N	Median (range)	Mean±(SD)	Median (range)	Mean±(SD)	P_1=0.2 P_2=0.3
ASD	13	3.3 (1.6-5.7)	3.3±1.5	0 (0-40)	7.4±15.1	AB	17	8.3 (6.0-12.7)	8.8±2.2	0 (0-24)	2.8±5.9	A
CP	22	3.0 (1.0-4.9)	2.9±1.0	0 (0-56)	6.3±13.6	AB	8	8.0 (6.2-12.1)	8.6±2.0	0 (0-2)	0.3±0.7	A
CHD‡	21	3.7 (0.6-5.7)	3.3±1.6	6 (0-61)	13.3±18.4	B	9	8.3 (6.0-16.1)	8.3±3.1	2 (0-10)	2.4±3.6	A
DS	17	2.8 (1.1-5.5)	3.2±1.3	0 (0-47)	3.9±11.6	AB	13	9.5 (6.0-25.8)	11.2±5.4	0 (0-1)	0.2±0.4	A
Controls	24	2.3 (0.5-4.7)	2.4±0.9	0 (0-4)	0.3±0.9	A	6	7.3 (6.4-9.3)	7.6±1.1	0 (0-0)	0.0±0.0	A

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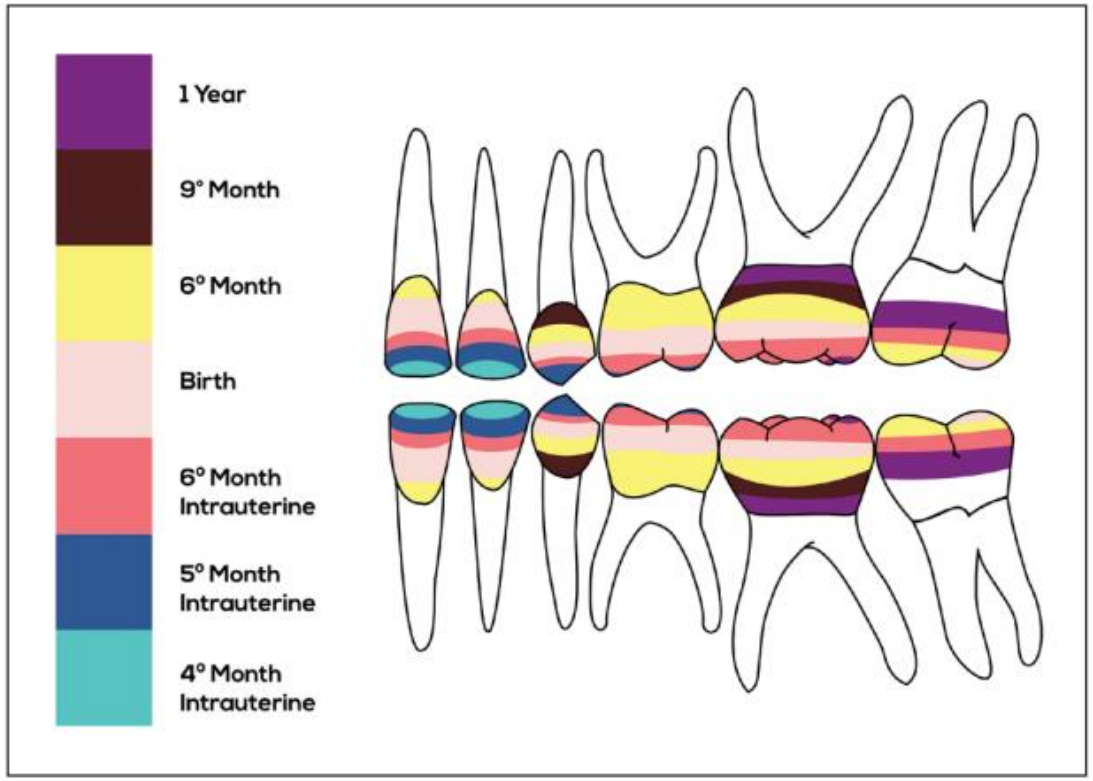
Congenital Heart Disease and Caries

- CHD leads to periods of cyanosis and abnormal enamel formation in upward of 50% in the developing primary dentition
- Enamel defects make teeth more caries susceptible
- Increased number of xerostomia-inducing medications are used by these patients



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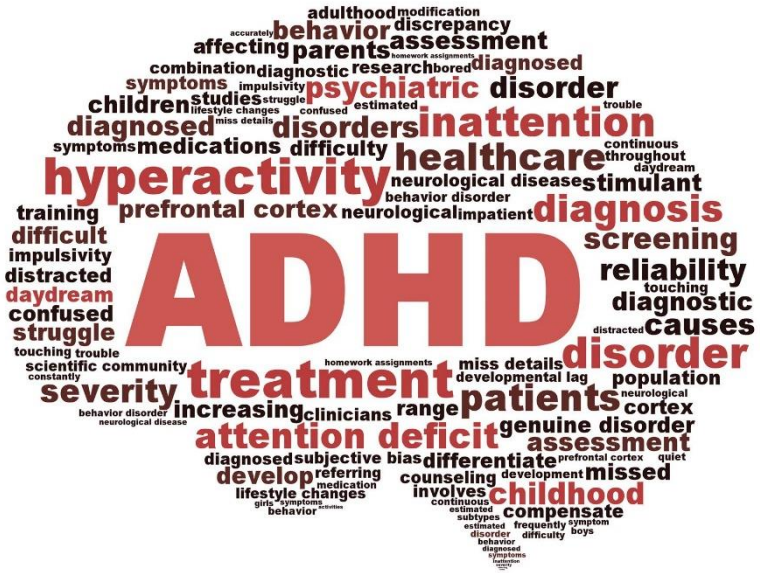
ADHD
hyperactivity
inattention
disorder
treatment
diagnosis
attention deficit
disorders
psychiatric
healthcare
severity
patients
childhood
assessment
diagnostic
causes
screening
reliability
difficult
impulsivity
distracted
daydream
confused
struggle
prefrontal cortex
neurological
impatient
medications
difficulty
symptoms
diagnosed
children
studies
behavior
parents
affecting
discrepancy
adulthood
modification
accurately
homework assignments
bored
research
diagnostic
combination
impulsivity
struggle
lifestyle changes
confused
estimated
trouble
miss details
continuous
throughout
daydream
neurological disease
stimulant
behavior disorder
training
touching
trouble
scientific community
constantly
increasing
clinicians
range
genuine disorder
cortex
population
developmental lag
miss details
neurological
behavior disorder
neurological disease
diagnosed
subjective bias
differentiate
prefrontal cortex
quiet
develop
referring
medication
lifestyle changes
girls
symptoms
attention
behavior
counseling
development
missed
involves
continuous
estimated
subtypes
compensate
estimated
frequently
symptom
disorder
difficulty
boys
behavior
diagnosed
symptoms
inattention
ADHD

Salivary Flow Rate and Plaque Index

- Unstimulated Salivary Flow (ml/min):
  - 0.72, ADHD no meds
  - 0.85, ADHD + meds
  - 1.13, control (p=0.016)
- Higher plaque index in patients with ADHD
- No difference in caries

Oral health status, salivary flow rate and salivary quality in children, adolescents and young adults with ADHD

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Salivary flow rate

ABSTRACT

Background: Attention deficit hyperactivity disorder (ADHD) is a childhood neurological disorder that presents in 3–7% of school-age children. Studies have shown that children, adolescents and young adults with ADHD are more prone to caries than those without.

Aim: The study investigated a possible relationship between the oral health status of children, adolescents and young adults diagnosed with ADHD, both with and without pharmacological intervention, and the following: salivary flow rate, pH, mucosal pH, plaque index (PI), oral hygiene and dietary behaviour.

Study design: DMFT/deft index (Dft: Decay, M/m: Missing, F/f: Filled, T/t: teeth), plaque index, oral mucosal pH and unstimulated whole salivary flow (USF) were examined in three groups of children, adolescents and young adults: those diagnosed with ADHD with no pharmacological intervention (N = 31), those treated with medications for ADHD (N = 30), and a healthy control group (N = 30). Diet and oral health habits were assessed by means of questionnaires completed by parents.

Results: Mean USF values were 0.72, 0.85 and 1.13 ml/min for participants with ADHD and without medication, with ADHD and with medication, and without ADHD, respectively ($p = 0.016$). There were no differences in the DMFT/deft index and in parent reported diet and oral health behaviour between the three groups. Children with ADHD demonstrated a statistically significant higher plaque index ($p < 0.05$).

Conclusions: The ADHD group, with or without pharmacological intervention, showed higher plaque index and lower USF, but no difference in DMFT/deft. The ADHD group did not differ from the non-ADHD group in their diet or oral health behaviour as assessed by parent reports.

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1. Introduction

Attention deficit hyperactivity disorder (ADHD) is a pervasive childhood neurological disorder characterized by a developmentally inappropriate activity level, low frustration tolerance, impulsivity, poor sociobehavioral behaviour, distractibility and inability to sustain attention and concentration. It is one of the more common childhood disorders.

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1 These authors contributed equally to the study.

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doi:10.1016/j.archoralbio.2011.03.018

Hidas A, Noy AF, Birman N, Shapira J, Matot I, Steinberg D, Moskovitz M. Oral health status, salivary flow rate and salivary quality in children, adolescents and young adults with ADHD. Arch Oral Biol. 2011 Oct;56(10):1137-41.

Dental Caries

- Surprisingly few studies have investigated this topic
- Typically included relatively small sample sizes (<100)
- Generally support association with dental caries

Maupome G. Swedish children with ADHD do not have a higher experience of dental caries compared to children without an ADHD diagnosis, in spite of showing poor dietary and oral hygiene patterns. J Evid Based Dent Pract. 2008 Mar;8(1):35-6.

Maupome G. Diverse components of the oral environment in attention-deficit hyperactivity disorder (ADHD) make it difficult to establish whether ADHD is a risk factor for dental caries. J Evid Based Dent Pract. 2005 Mar;5(1):39-40.

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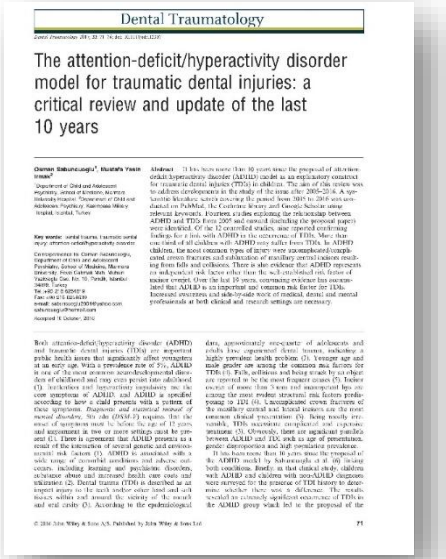
Broadbent JM, Ayers KM, Thomson WM. Is attention-deficit hyperactivity disorder a risk factor for dental caries? A case-control study. Caries Res. 2004 Jan-Feb;38(1):29-33.

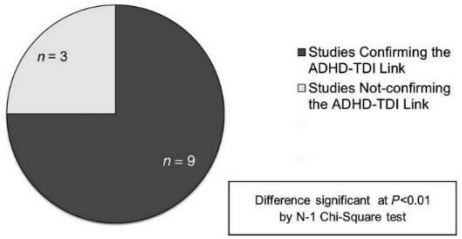
Trauma

Trauma is experienced by:

- 1/4 of all adolescents/adults,
- >1/3 of patients with ADHD


Dental Traumatology

The attention-deficit/hyperactivity disorder model for traumatic dental injuries: a critical review and update of the last 10 years



Sabuncuoglu O, Irmak MY. The attention-deficit/hyperactivity disorder model for traumatic dental injuries: a critical review and update of the last 10 years. Dent Traumatol. 2017 Apr;33(2):71-76.

Improving the Dental Visit

- Schedule AM appointments
- Avoid treatment during “medication holidays”
- Provide treatment quickly
- Use short, clear instructions
- Use rewards and positive reinforcement

Nutritional Considerations

Challenges

- Decreased ability to consume nutritious food (oral motor dysfunction, cleft lip/palate)
- Inability to utilize calories (GERD)
- Increased caloric requirement (hyperthyroidism)
- Medications may negatively affect appetite (ADHD)
- Condition may negatively affect appetite (Prader Willi Syndrome)
- Patient may have a selective or limited diet (autism)
- Oral medications may come in sweetened liquid suspension

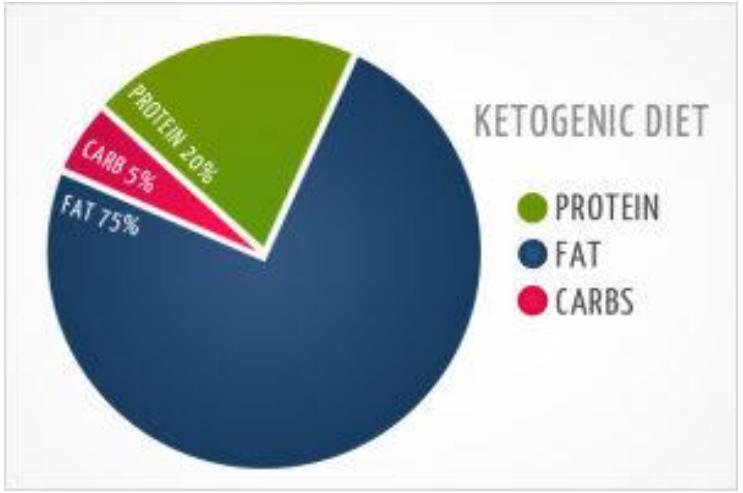
Special Diets and Supplements are Common (50%)

- Ketogenic Diet
- Casein and Gluten free diet
- Melatonin
- Methyl B12
- Omega-3 fatty acids
- Probiotics

Höfer J, Hoffmann F, Bachmann C. Use of complementary and alternative medicine in children and adolescents with autism spectrum disorder: A systematic review. Autism. 2017 May;21(4):387-402

The Ketogenic Diet

- Nonpharmacological treatment for seizure disorders
- Has been used successfully to treat: intractable epilepsy, Rett syndrome, Lennox-Gastaut syndrome, and mitochondrial disorders
- Uses a ratio of 4:1 fat to combined protein and carbohydrate
- Mechanism of action is unknown, but theorized that ketone bodies interact with brain sites associated with hyperexcitability
- Side effects may include vitamin/mineral deficiency, growth inhibition, GERD, constipation, kidney stones, cardiovascular complications
- Advantage: Not cariogenic!



The Ketogenic Diet

- It is critical that the dental provider not upset patient's state of ketosis
- Caution in use of liquid medications
- Only recommend approved toothpastes, prophy paste, fluoride varnish

https://charliefoundation.org

Gluten-Free/Casein-Free Diet

- Food allergies are found in 8% of children worldwide
  - Celiac disease is found in about 1%
  - Milk protein allergies are found in about 1.8%
- Current evidence of effectiveness shows weak associations with improved behavior
- GFCF diets are employed to lessen negative behaviors associated with:
  - Autism
  - ADHD
  - Bipolar disorder
  - Schizophrenia

Feeding Disorders

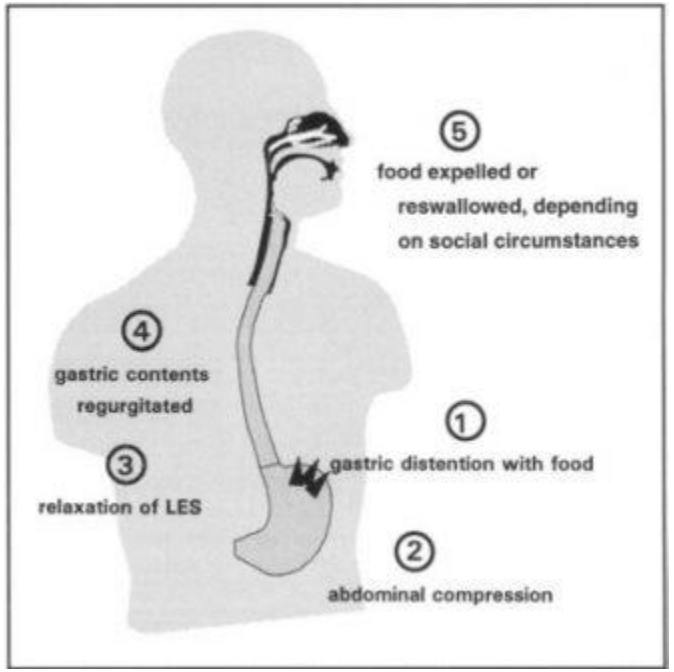
- When a child's feeding difficult hinders growth and/or emotional development, they are considered to have a feeding disorder per DSM-5:
  - Pica
  - Rumination disorder
  - Avoidant/restrictive food intake disorder

Pica

- The persistent eating of nonnutritive substances for a period of at least 1 month
- May include: soil, chalk, plaster, clay, paint, paper, cloth, sand, hair, plastic, coal, insects, wood, pebbles
- Must be differentiated from cultural practices or developmentally appropriate behavior
- Theorized that it is an attempt to self-soothe
- Dental team should be on the look out for damage to the dentition, periodontal impaction of non-food items

Rumination Disorder

- Repeated regurgitation and re-chewing of swallowed or partially digested food
- May result from a child's need for self stimulation or as a result of stress/anxiety
- May result in weight loss, malnutrition, infection susceptibility, and even death
- In infants it tends to resolve over time, but with older CSHCN it may develop into a longstanding concern
- Dental team should be on the lookout for erosive wear and inflamed gingival tissues

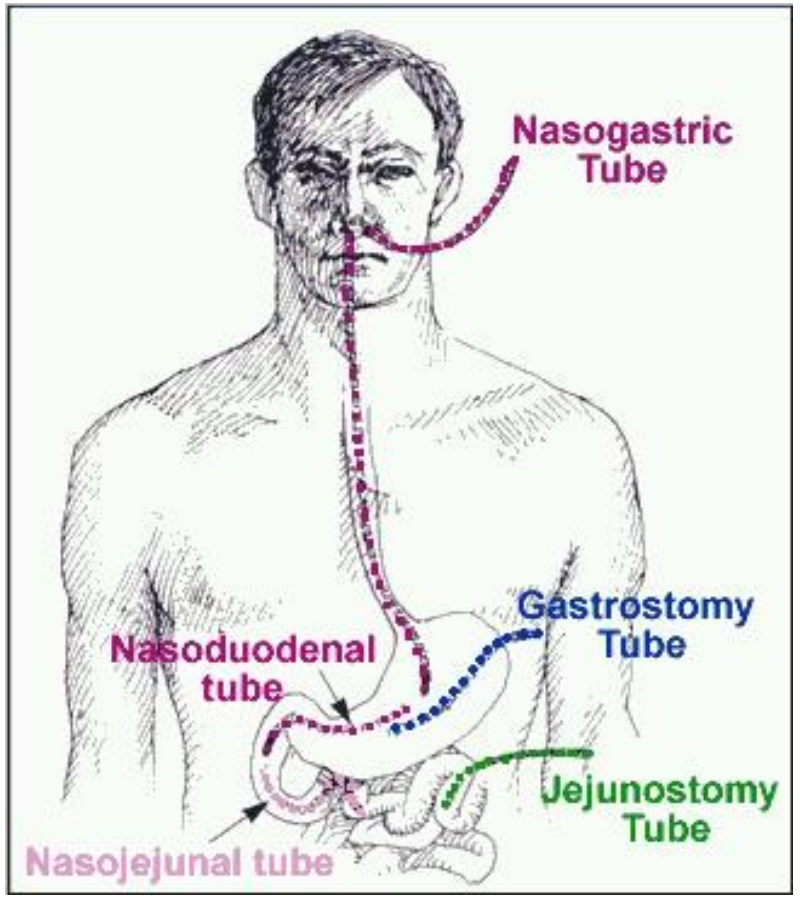


Avoidant/Restrictive Food Intake Disorder (ARFID)

- A feeding disturbance that causes persistent failure to meet appropriate nutritional and/or energy needs
- Associated with at least one of the following:
  - Significant weight loss or limited growth
  - Significant nutritional deficiency
  - Dependence on enteral feeding or oral nutritional supplements
  - Marked interference with psychosocial functioning
- Food refusal may be associated with:
  - GERD, neurological conditions, food allergies, anatomical anomalies, and delayed gastric emptying, autism, OCD, phobias, sensory processing D/O
- May result in refusal of home or professional oral hygiene interventions

Feeding Tubes

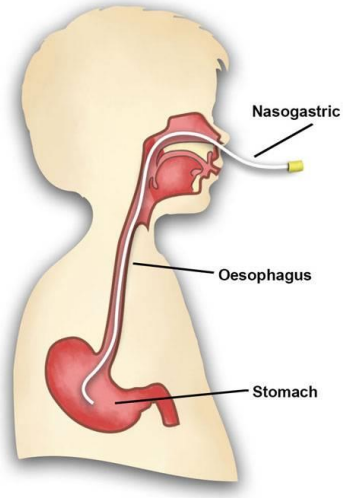
- Allow for nutrient-rich formula to be provided continuously or in boluses
- If the child is able to eat orally, the oral feeding plan will be maintained in conjunction with tube feeding
- Some children may only receive “social tastings” where they may or may not swallow foods
- Important to determine percent and type of food taken orally



Feeding Tubes

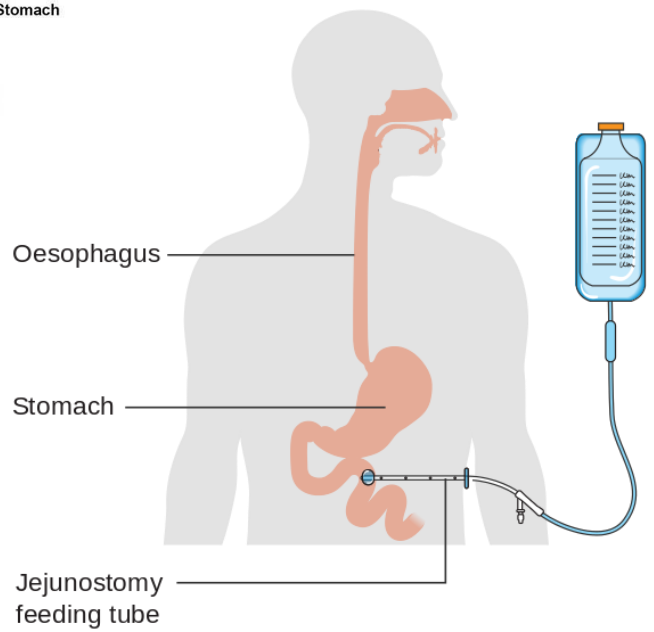
Nonsurgical

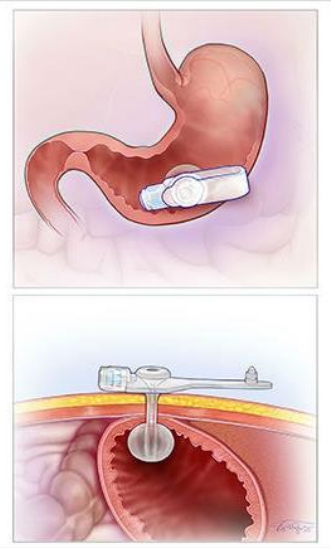
- Nasogastric (NG tube)
- Orogastric (OG tube)
- Duodenal



Surgical

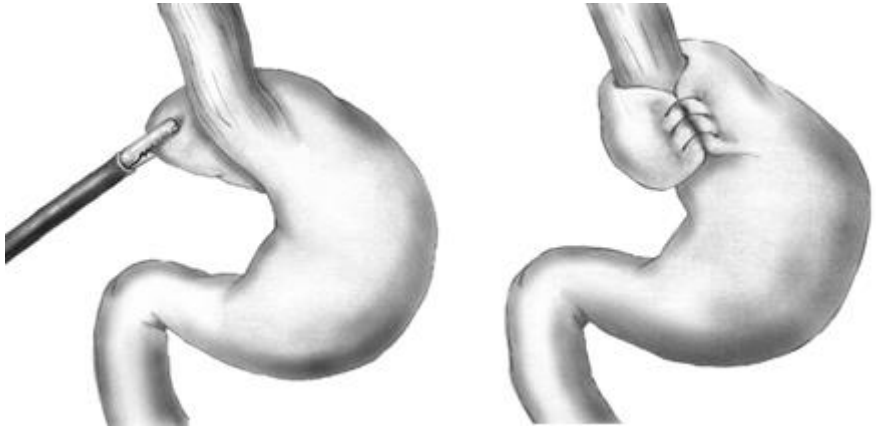
- Gastrostomy (G tube)
- Jejunostmy (J tube)





Nissen Fundoplication

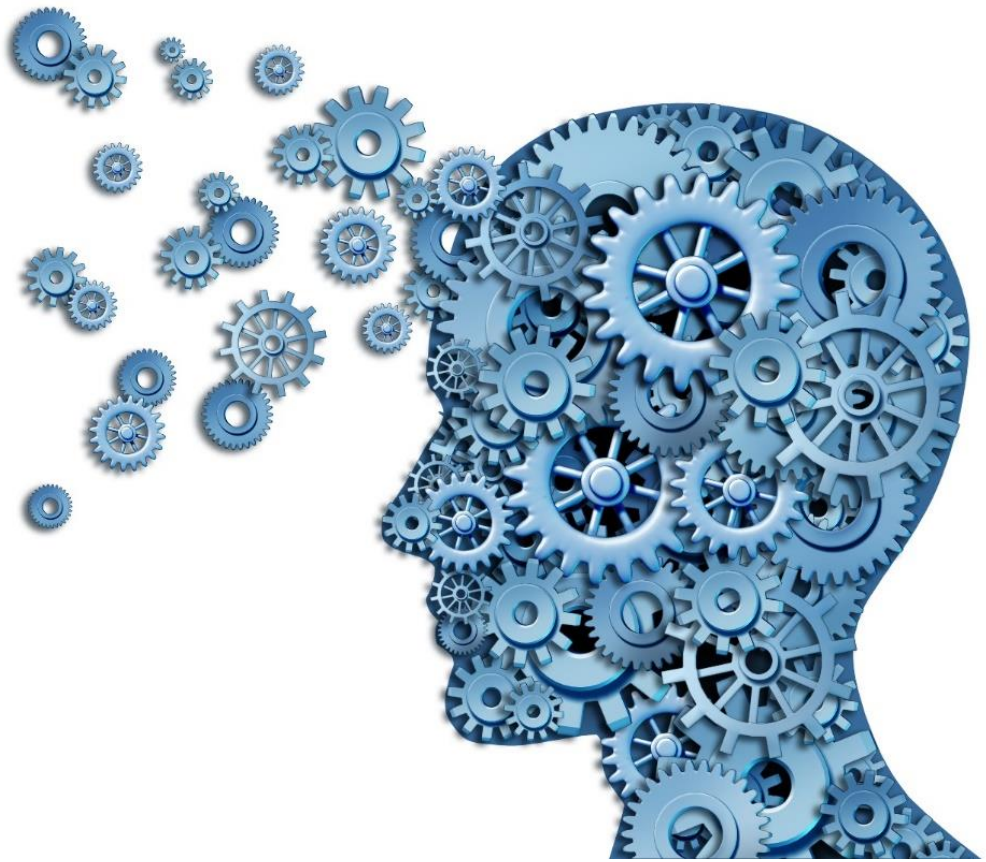
- Performed in children with feeding dysfunction due to GERD that is nonresponsive to medication and feeding modification
- Fundus is wrapped around the esophagus to tighten the lower esophageal sphincter to reduce reflux of gastric contents
- Often combined with a G-tube procedure



Feeding Modifications to Consider

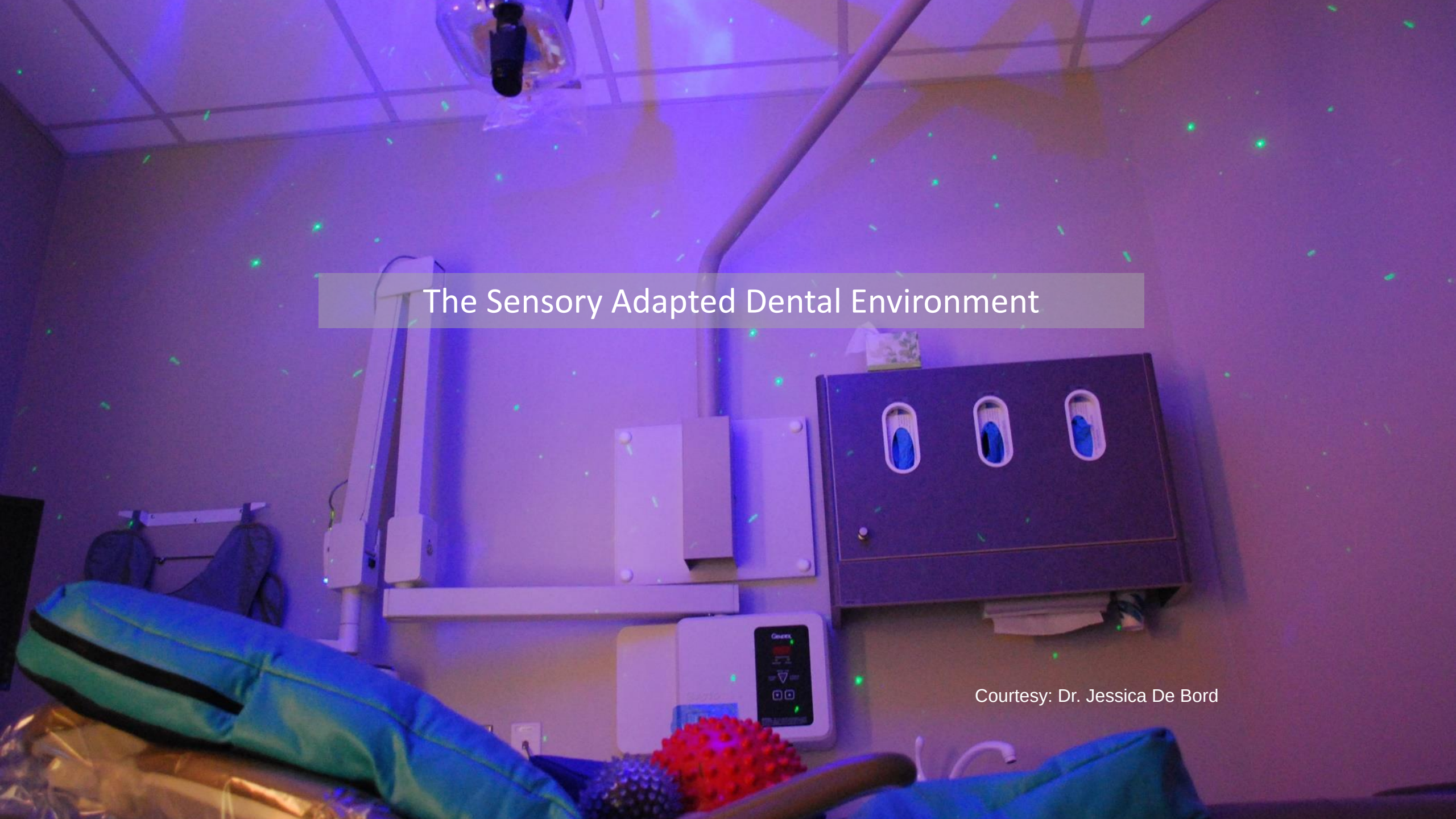
- Consider substituting non-cariogenic rewards for sweets/candy in behavior modification/therapy
- Emphasize increased daily oral hygiene and preventive recall schedule for patients who must eat frequently
- Suggest mildly flavored oral hygiene products for children who are taste/texture avoidant
- Discuss the option of prescription medication with the medical team if signs of GERD are discovered

Desensitization



Dental visits, blood draws, and haircuts
may be among the most difficult visits
for children with ASD

The Sensory Adapted Dental Environment



Courtesy: Dr. Jessica De Bord

Sensory Rooms Gaining In Popularity

By DEENA YELLIN, THE RECORD/TNS
December 5, 2014

Text Size A A

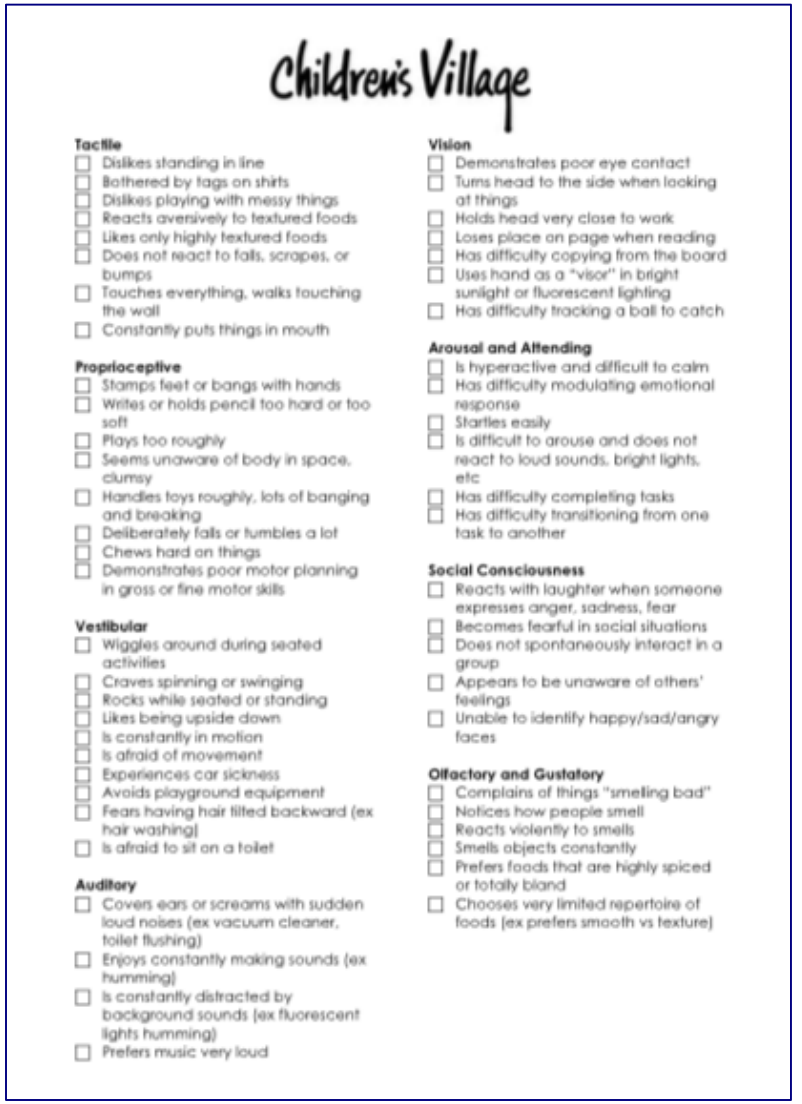
School psychologist Patricia Urgo talks with Andrew Smith-Hinson, 18, in a sensory room at the Felician School for Exceptional Children in Lodi, N.J. The room, which utilizes soft furniture, special lights, optics and other features, is designed to help children with disabilities calm down. (Chris Pedota/The Record/TNS)

HACKENSACK, N.J. — In the dimly lit room, Tiara Santos lounged on the beanbag chair, stared at the bubble tubes and played with glow-in-the-dark toys, and then slowly, the demeanor of the girl with autism began to transform.

Sensory Survey

Domains

- Tactile
- Proprioceptive
- Vestibular
- Auditory
- Vision
- Arousal & Attending
- Social Consciousness
- Olfactory & Gustatory



Children's Village

Tactile
- ☐ Dislikes standing in line
- ☐ Bothered by tags on shirts
- ☐ Dislikes playing with messy things
- ☐ Reacts aversively to textured foods
- ☐ Likes only highly textured foods
- ☐ Does not react to falls, scrapes, or bumps
- ☐ Touches everything, walks touching the wall
- ☐ Constantly puts things in mouth

Proprioceptive
- ☐ Stamps feet or bangs with hands
- ☐ Writes or holds pencil too hard or too soft
- ☐ Plays too roughly
- ☐ Seems unaware of body in space, clumsy
- ☐ Handles toys roughly, lots of banging and breaking
- ☐ Deliberately falls or tumbles a lot
- ☐ Chews hard on things
- ☐ Demonstrates poor motor planning in gross or fine motor skills

Vestibular
- ☐ Wiggles around during seated activities
- ☐ Craves spinning or swinging
- ☐ Rocks while seated or standing
- ☐ Likes being upside down
- ☐ Is constantly in motion
- ☐ Is afraid of movement
- ☐ Experiences car sickness
- ☐ Avoids playground equipment
- ☐ Fears having hair tilted backward (ex hair washing)
- ☐ Is afraid to sit on a toilet

Auditory
- ☐ Covers ears or screams with sudden loud noises (ex vacuum cleaner, toilet flushing)
- ☐ Enjoys constantly making sounds (ex humming)
- ☐ Is constantly distracted by background sounds (ex fluorescent lights humming)
- ☐ Prefers music very loud

Vision
- ☐ Demonstrates poor eye contact
- ☐ Turns head to the side when looking at things
- ☐ Holds head very close to work
- ☐ Loses place on page when reading
- ☐ Has difficulty copying from the board
- ☐ Uses hand as a "visor" in bright sunlight or fluorescent lighting
- ☐ Has difficulty tracking a ball to catch

Arousal and Attending
- ☐ Is hyperactive and difficult to calm
- ☐ Has difficulty modulating emotional response
- ☐ Startles easily
- ☐ Is difficult to arouse and does not react to loud sounds, bright lights, etc
- ☐ Has difficulty completing tasks
- ☐ Has difficulty transitioning from one task to another

Social Consciousness
- ☐ Reacts with laughter when someone expresses anger, sadness, fear
- ☐ Becomes fearful in social situations
- ☐ Does not spontaneously interact in a group
- ☐ Appears to be unaware of others' feelings
- ☐ Unable to identify happy/sad/angry faces

Olfactory and Gustatory
- ☐ Complains of things "smelling bad"
- ☐ Notices how people smell
- ☐ Reacts violently to smells
- ☐ Smells objects constantly
- ☐ Prefers foods that are highly spiced or totally bland
- ☐ Chooses very limited repertoire of foods (ex prefers smooth vs texture)

Tactile

Edushape Soft Sensory Ball Set & Abilitations Sensory Ball Set
www.Abilitations.com $32.99 & $34.19

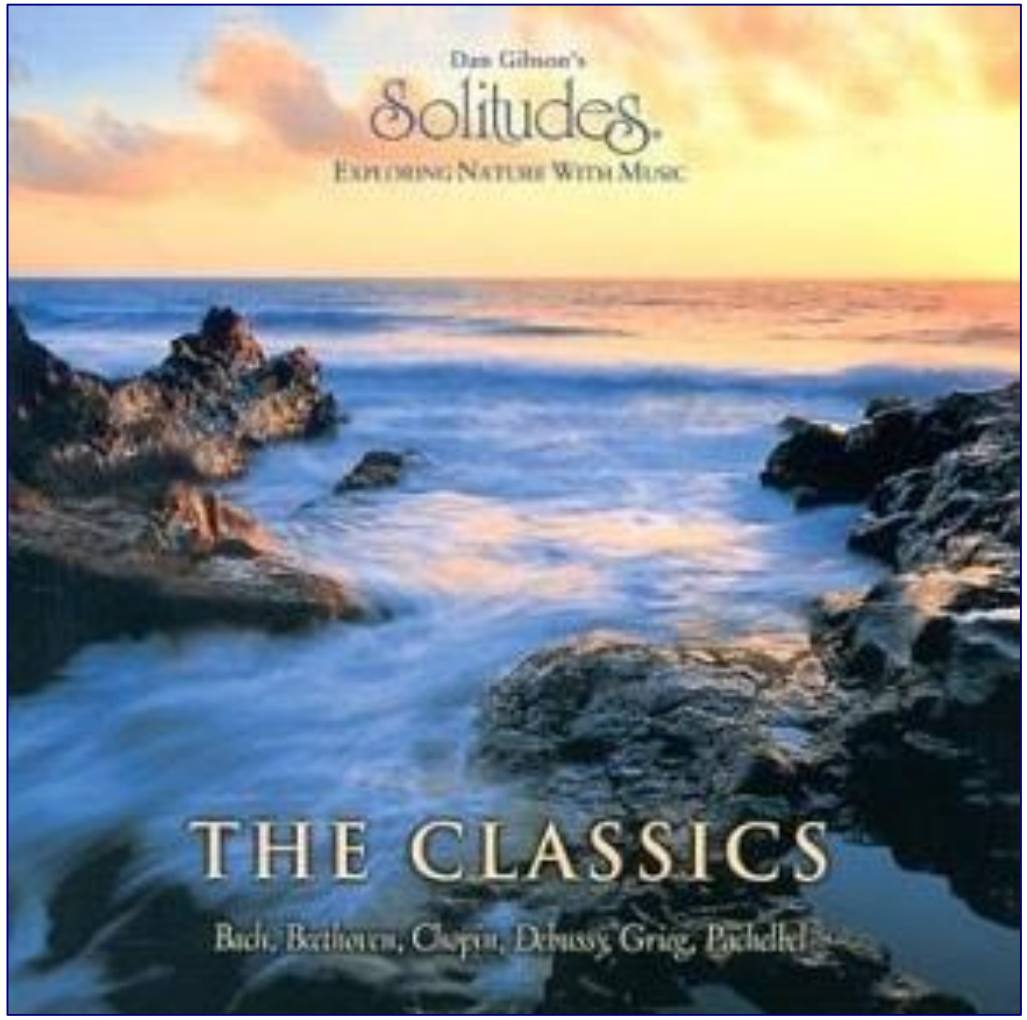
Proprioceptive

Stay N Place Chair Cushion
www.SpecializedCare.com $169.00

Vestibular

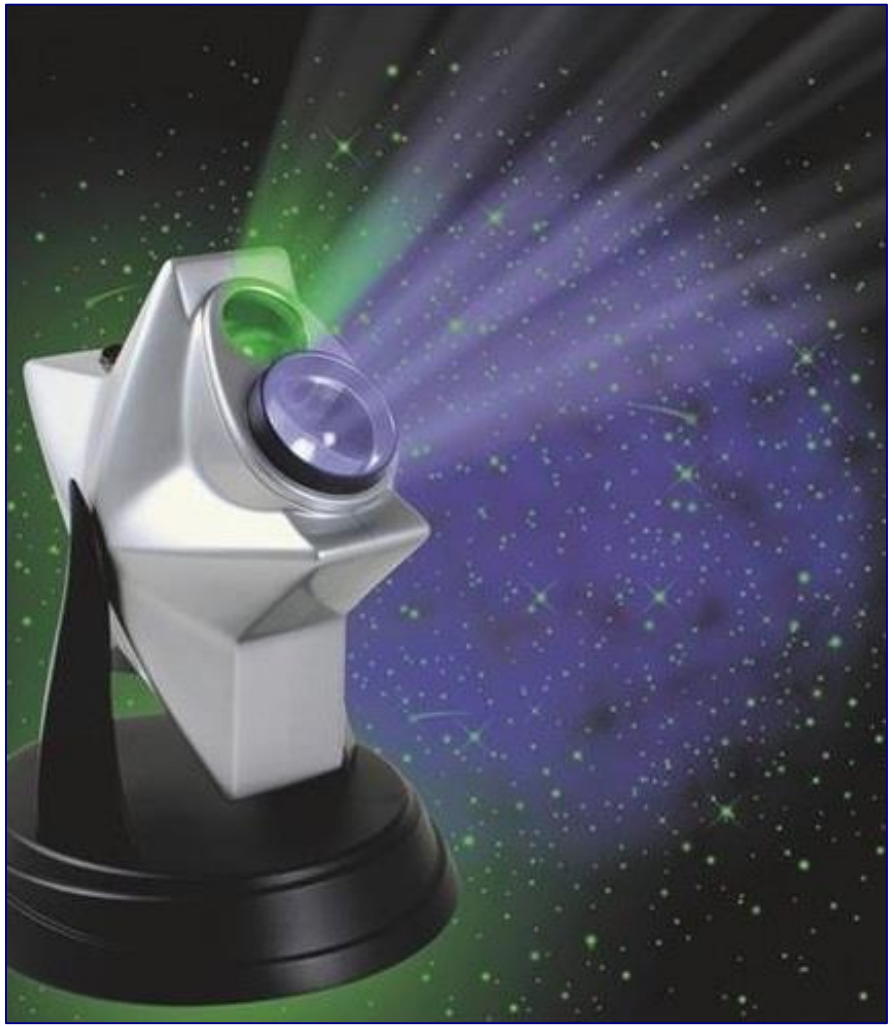
Senseez Vibrating Pillow
www.amazon.com $37.99

Auditory



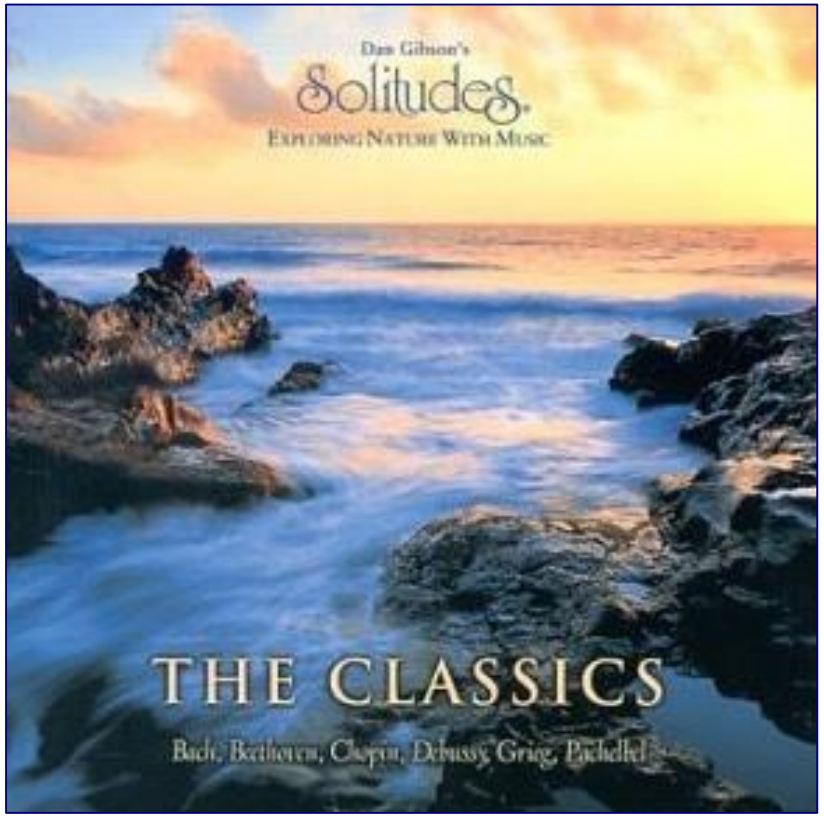
Dan Gibson's Solitudes – Exploring Nature with Music – The Classics
www.amazon.com $17.77

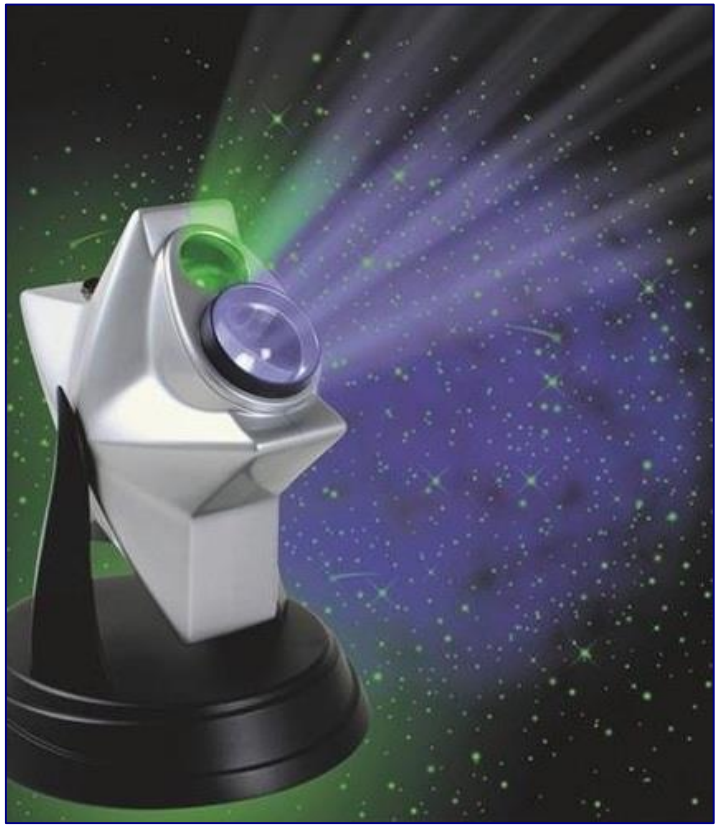
Vision



Laser Twilight Projector
www.amazon.com $129.67

Arousal & Attending





Social Consciousness

Hexagon Bubble Bottles
www.amazon.com $8.86

Olfactory & Gustatory

Behavior modification is focused on changing problem or avoidance behaviors to facilitate dental treatment. The basic tenet of behavior modification is that the patient's behavior is learned and that the principles of learning can be applied to develop or change behavior.

Kohlenberg R, Greenberg D, Reymore L, Hass G. Behavior modification and the management of mentally retarded dental patients. ASDC J Dent Child 1972;39(1):61-7.

Avoidance increases anxiety, but controlled exposure to stimuli can reduce it. Through “successive approaches” the child is gradually exposed to anxiety provoking stimuli, while being reinforced with pleasant experiences.

JetBlue Wings for Autism Video

Why Not Use the Same Approach
at the Dental Office?

The Road To Oral Health

Terminology

Reinforcement: providing a reward for a desired behavior

Shaping: gradually modifying behavior towards a target or goal

Cueing: physical or verbal indication to perform a behavior

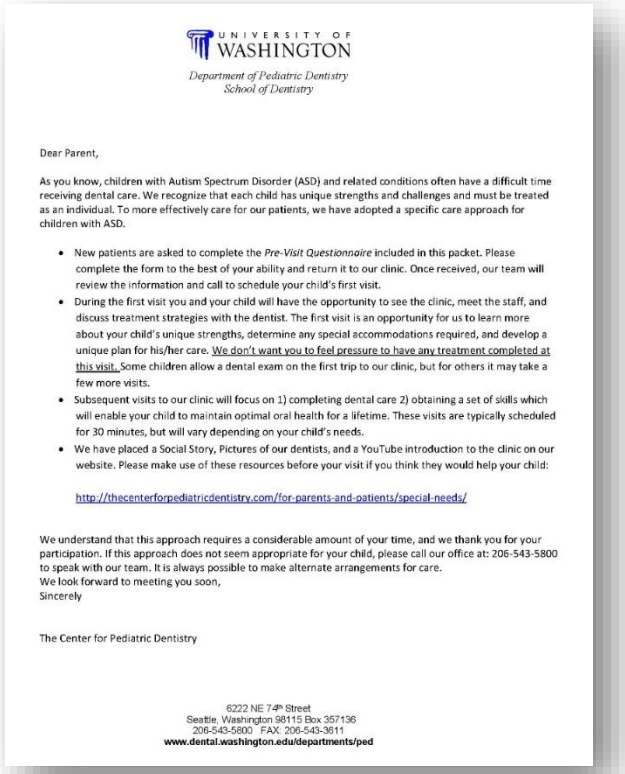
Modeling: learning by observation

Fading: removing a prompt when no longer needed OR switching one response for another (tongue depressor for a mirror)

Patient Video: Joel

The UW Autism Clinic Experience

Welcome Letter



UNIVERSITY OF WASHINGTON

Department of Pediatric Dentistry
School of Dentistry

Dear Parent,

As you know, children with Autism Spectrum Disorder (ASD) and related conditions often have a difficult time receiving dental care. We recognize that each child has unique strengths and challenges and must be treated as an individual. To more effectively care for our patients, we have adopted a specific care approach for children with ASD.

- New patients are asked to complete the *Pre-Visit Questionnaire* included in this packet. Please complete the form to the best of your ability and return it to our clinic. Once received, our team will review the information and call to schedule your child's first visit.
- During the first visit you and your child will have the opportunity to see the clinic, meet the staff, and discuss treatment strategies with the dentist. The first visit is an opportunity for us to learn more about your child's unique strengths, determine any special accommodations required, and develop a unique plan for his/her care. We don't want you to feel pressure to have any treatment completed at this visit. Some children allow a dental exam on the first trip to our clinic, but for others it may take a few more visits.
- Subsequent visits to our clinic will focus on 1) completing dental care 2) obtaining a set of skills which will enable your child to maintain optimal oral health for a lifetime. These visits are typically scheduled for 30 minutes, but will vary depending on your child's needs.
- We have placed a Social Story, Pictures of our dentists, and a YouTube introduction to the clinic on our website. Please make use of these resources before your visit if you think they would help your child:

  http://thecenterforpediatricdentistry.com/for-parents-and-patients/special-needs/

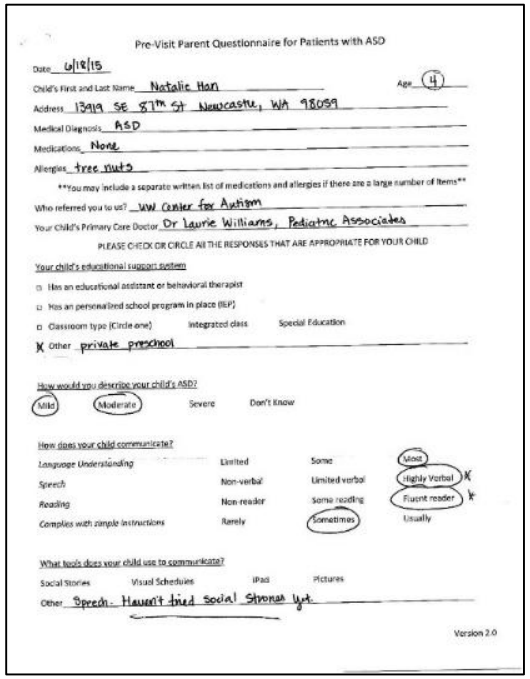
We understand that this approach requires a considerable amount of your time, and we thank you for your participation. If this approach does not seem appropriate for your child, please call our office at: 206-543-5800 to speak with our team. It is always possible to make alternate arrangements for care.
We look forward to meeting you soon,
Sincerely

The Center for Pediatric Dentistry

6222 NE 74th Street
Seattle, Washington 98115 Box 357136
206-543-5800 · FAX: 206-543-3611
www.dental.washington.edu/departments/ped

Questionnaire

- Medical diagnosis
- Educational support
- Communication
- Strengths
- Interests
- Triggers
- Rewards
- Parent Expectations



Pre-Visit Parent Questionnaire for Patients with ASD

Date 6/18/15

Child's First and Last Name Natalie Han Age 4

Address 13419 SE 87th St Newcastle, WA 98059

Medical Diagnosis ASD

Medications None

Allergies tree nuts

You may include a separate written list of medications and allergies if there are a large number of items

Who referred you to us? UW Center for Autism

Your Child's Primary Care Doctor Dr Laurie Williams, Pediatric Associates

PLEASE CHECK OR CIRCLE ALL THE RESPONSES THAT ARE APPROPRIATE FOR YOUR CHILD

Your child's educational support system

- ☐ Has an educational assistant or behavioral therapist
- ☐ Has an personalized school program in place (IEP)
- ☐ Classroom type (Circle one) Integrated class Special Education
- X Other private preschool

How would you describe your child's ASD?

Mild (Moderate) Severe Don't Know

How does your child communicate?

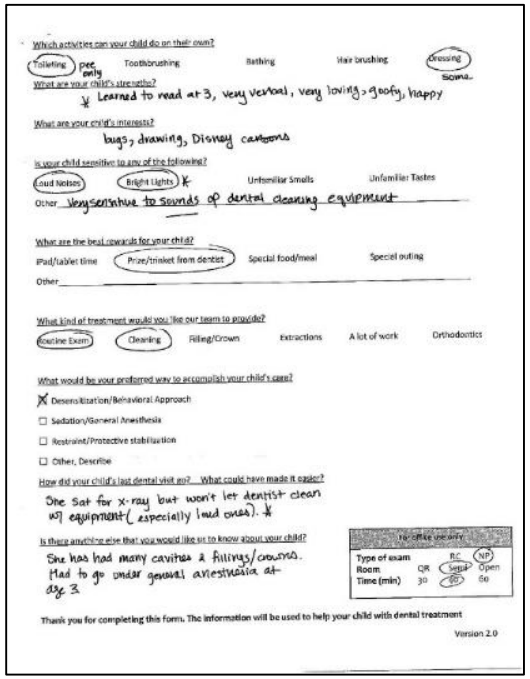
Language Understanding	Limited	Some	(Most)
Speech	Non-verbal	Limited verbal	(Highly Verbal) X
Reading	Non-reader	Some reading	(Fluent reader) X
Complies with simple instructions	Rarely	(Sometimes)	Usually

What tools does your child use to communicate?

Social Stories Visual Schedules iPad Pictures

Other Speech. Haven't tried social Stories yet.

Version 2.0



Which activities can your child do on their own?

(Toileting pee only) Toothbrushing Bathing Hair brushing (Dressing some)

What are your child's strengths?

X Learned to read at 3, very verbal, very loving, goofy, happy

What are your child's interests?

bugs, drawing, Disney cartoons

Is your child sensitive to any of the following?

Loud Noises (Bright Lights) X Unfamiliar Smells Unfamiliar Tastes

Other Very sensitive to sounds of dental cleaning equipment

What are the best rewards for your child?

iPad/tablet time (Prize/trinket from dentist) Special food/meal Special outing

Other

What kind of treatment would you like our team to provide?

(Routine Exam) (Cleaning) Filling/Crown Extractions A lot of work Orthodontics

What would be your preferred way to accomplish your child's care?

X Desensitization/Behavioral Approach

☐ Sedation/General Anesthesia

☐ Restraint/Protective stabilization

☐ Other, Describe

How did your child's last dental visit go? What could have made it easier?

She sat for x-ray but won't let dentist clean w/ equipment (especially loud ones). X

Is there anything else that you would like us to know about your child?

She has had many cavities & fillings/crowns. Had to go under general anesthesia at age 3

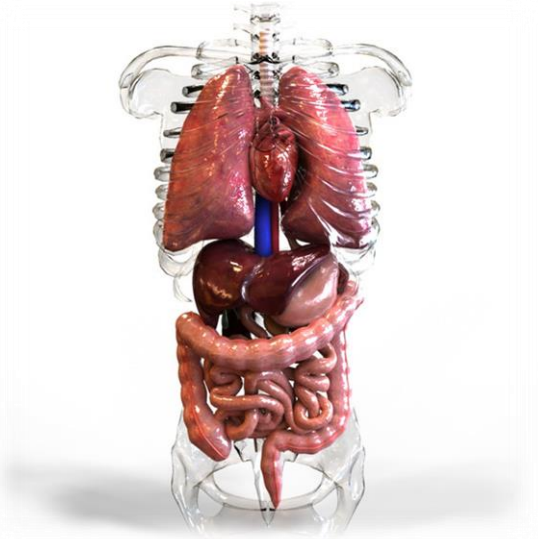
To office use only:			
Type of exam		RC	(NP)
Room	OR	(Septa)	Open
Time (min)	30	(60)	60

Thank you for completing this form. The information will be used to help your child with dental treatment

Version 2.0

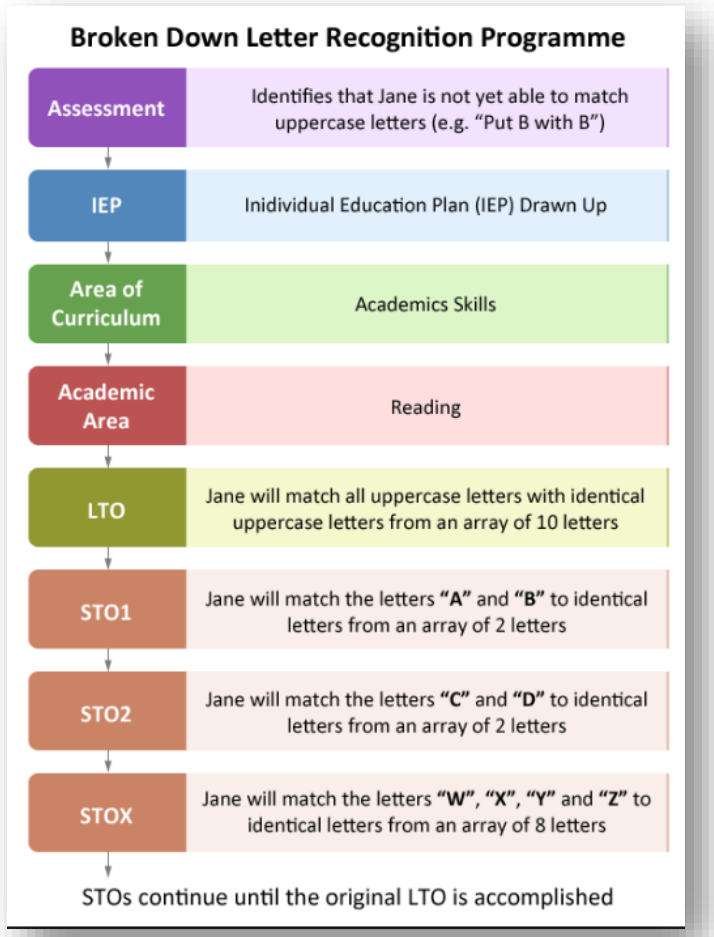
Medical Diagnoses, Medications, Allergies

- *A baseline for providing safe dental care*
- *Number and complexity of medical conditions offers clues to ID severity*



Child's Educational Support System

- *Gives insight into degree that child and family are participating in other therapeutic and behavioral services*
- *Some strategies may be adapted to the dental environment*
- *Members of the child's care team (e.g. behavioral therapists) may accompany the patient to dental visits and/or work on skills outside the dental office*
- *The child may have an IEP that describes goals and accommodations for the child at school. It is often possible to have oral care added to the patient's IEP (e.g. toothbrushing is completed by an aid daily at school).*


Broken Down Letter Recognition Programme
Assessment
Identifies that Jane is not yet able to match uppercase letters (e.g. “Put B with B”)
IEP
Inidividual Education Plan (IEP) Drawn Up
Area of Curriculum
Academics Skills
Academic Area
Reading
LTO
Jane will match all uppercase letters with identical uppercase letters from an array of 10 letters
STO1
Jane will match the letters “A” and “B” to identical letters from an array of 2 letters
STO2
Jane will match the letters “C” and “D” to identical letters from an array of 2 letters
STOX
Jane will match the letters “W”, “X”, “Y” and “Z” to identical letters from an array of 8 letters
STOs continue until the original LTO is accomplished

Communication

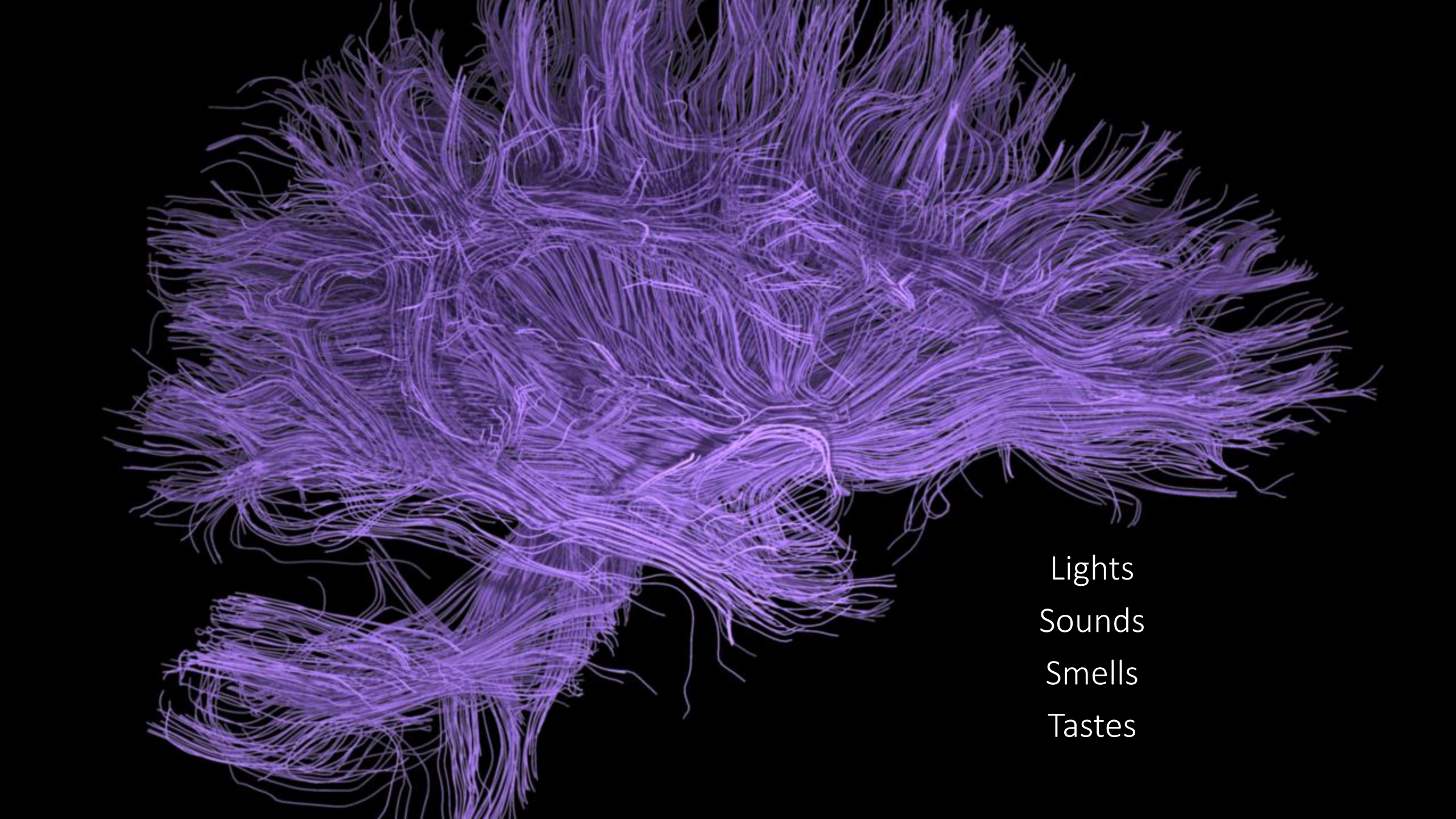
- *Enables provider to engage with patient in her own communication "currency"*
- *Parents can often be used as "interpreters" for the patient*
- *If the patient is accustomed to using visual schedules or Social Stories (discussed at length below), dental stories or sequence cards can be offered to the family at or before the initial visit*

Child’s Strengths and abilities

- *Leveraging current strengths is a good starting point for development of new skills*
- *The practitioner gains trust and encourages engagement by learning about the patient’s interests and discussing topics she cares about*

“Please focus and build on what I can do rather than what I can’t do.”

Ten Things Every Child With Autism Wishes You Knew, Ellen Notbohm, 2005
Image: Farmer’s Almanac


Lights
Sounds
Smells
Tastes

Preferred Rewards

Many patients enjoy standard rewards such as stickers or tokens, but it is common for items that are not typically thought of as reinforcers to be highly motivating to the patient

Select Powerful Reinforcers

Pen Waggener

Reinforcement

Sensory Responsiveness

- *Patients may be hyper or hypo responders, indicating that they avoid or seek stimulation during visits*
- *Accordingly, the team should encourage or avoid sensory input (e.g. smells, tastes, etc.)*

Dental History

- *Provides insight into what has worked or failed previously*
- *Some patients may have preconceived notions of dental care based upon negative past experiences*

Parent Expectations

- *The people who live with the patient understand her best and will be responsible to prepare her for appointments*
- *Caregiver satisfaction and treatment success hinge upon mutually agreed upon goals*

Pre-Visit Parent Questionnaire for Patients with ASD

Date 6/18/15

Child's Fir [redacted] Age (4)

Address

Medical Diagnosis

Medications None

Allergies tree nuts

You may include a separate written list of medications and allergies if there are a large number of items

Who referred you to us? UW Center for Autism

Your Child's Primary Care Doctor Dr Laurie Williams, Pediatric Associates

PLEASE CHECK OR CIRCLE All THE RESPONSES THAT ARE APPROPRIATE FOR YOUR CHILD

Your child's educational support system

- ☐ Has an educational assistant or behavioral therapist
- ☐ Has an personalized school program in place (IEP)
- ☐ Classroom type (Circle one) Integrated class Special Education
- X Other private preschool

How would you describe your child's ASD?

(Mild) (Moderate) Severe Don't Know

How does your child communicate?

Language Understanding	Limited	Some	(Most)
Speech	Non-verbal	Limited verbal	(Highly Verbal) *
Reading	Non-reader	Some reading	(Fluent reader) *
Complies with simple instructions	Rarely	(Sometimes)	Usually

What tools does your child use to communicate?

Social Stories Visual Schedules iPad Pictures

Other Speech. Haven't tried social stories yet.

Version 2.0

Which activities can your child do on their own?

(Toileting) pee only Toothbrushing Bathing Hair brushing (Dressing) Some

What are your child's strengths?

* Learned to read at 3, very verbal, very loving, goofy, happy

What are your child's interests?

bugs, drawing, Disney cartoons

Is your child sensitive to any of the following?

(Loud Noises) (Bright Lights) * Unfamiliar Smells Unfamiliar Tastes

Other Very sensitive to sounds of dental cleaning equipment

What are the best rewards for your child?

iPad/tablet time (Prize/trinket from dentist) Special food/meal Special outing

Other

What kind of treatment would you like our team to provide?

(Routine Exam) (Cleaning) Filling/Crown Extractions A lot of work Orthodontics

What would be your preferred way to accomplish your child's care?

- X Desensitization/Behavioral Approach
- ☐ Sedation/General Anesthesia
- ☐ Restraint/Protective stabilization
- ☐ Other, Describe

How did your child's last dental visit go? What could have made it easier?

She sat for x-ray but won't let dentist clean w/ equipment (especially loud ones). *

Is there anything else that you would like us to know about your child?

She has had many cavities & fillings/crowns. Had to go under general anesthesia at age 3

For office use only			
Type of exam		RC	(NP)
Room	QR	(Semi)	Open
Time (min)	30	(40)	60

Thank you for completing this form. The information will be used to help your child with dental treatment

Version 2.0

Pre-Visit Parent Questionnaire for Patients with ASD

Date

Child's Firs [redacted] Age 3 years 10 months

Address [redacted] Everett, wa 98208

Medical Diagnosis Sopt-MED AUTISM.

Medications None.

Allergies No,

You may include a separate written list of medications and allergies if there are a large number of items

Who referred you to us? Dora hall From Seattle Childrens Autism Center

Your Child's Primary Care Doctor Judith Kuo.

PLEASE CHECK OR CIRCLE All THE RESPONSES THAT ARE APPROPRIATE FOR YOUR CHILD

Your child's educational support system

- ✓ Has an educational assistant or behavioral therapist
- ✓ Has an personalized school program in place (IEP)
- ☐ Classroom type (Circle one) Integrated class (Special Education)
- ☐ Other

How would you describe your child's ASD?

Mild (Moderate) Severe Don't Know

How does your child communicate?

Language Understanding	Limited	(Some)	Most
Speech	Non-verbal	(Limited verbal)	Highly Verbal
Reading	(Non-reader)	Some reading	Fluent reader
Complies with simple instructions	Rarely	(Sometimes)	Usually

What tools does your child use to communicate?

(Social Stories) ✓ Visual Schedules (iPad) (Pictures)

Other

Version 2.0

Which activities can your child do on their own?

Toileting (Toothbrushing) ✓ Bathing Hair brushing (Dressing w/help)

? What are your child's strengths?

What are your child's interests?

Play piano, guitar, Fans.

Is your child sensitive to any of the following?

(Loud Noises) Bright Lights (Unfamiliar Smells) (Unfamiliar Tastes)

Other

What are the best rewards for your child?

iPad/tablet time Prize/trinket from dentist Special food/meal Special outing

Other

What kind of treatment would you like our team to provide?

(Routine Exam) (Cleaning) Filling/Crown Extractions A lot of work Orthodontics

? What would be your preferred way to accomplish your child's care?

- ☐ ✓ Desensitization/Behavioral Approach
- ☐ Sedation/General Anesthesia
- ☐ Restraint/Protective stabilization
- ☐ Other, Describe

How did your child's last dental visit go? What could have made it easier?

1 year ago.

Is there anything else that you would like us to know about your child?

He is Nervous when start something New also when he heard kid or baby crying, start screaming.

For office use only			
Type of exam		RC	(NP)
Room	(QR)	Semi	Open
Time (min)	30	(40)	60

Thank you for completing this form. The information will be used to help your child with dental treatment

Version 2.0

Pre-Visit Parent Questionnaire for Patients with ASD

Date 8-19-15

Child's F [redacted] Age 15

Address

Medical

Medications Risperidone & Levetiracetam

Allergies none known

You may include a separate written list of medications and allergies if there are a large number of items

Who referred you to us? Childrens Hospital

Your Child's Primary Care Doctor Molly Benett Coffman

PLEASE CHECK OR CIRCLE All THE RESPONSES THAT ARE APPROPRIATE FOR YOUR CHILD

Your child's educational support system

- ☐ Has an educational assistant or behavioral therapist
- ☑ Has an personalized school program in place (IEP)
- ☐ Classroom type (Circle one) Integrated class (Special Education)
- ☐ Other _____

Sched 11/16/15

How would you describe your child's ASD?

Mild Moderate Severe Don't Know

How does your child communicate?

Language Understanding	Limited	(Some)	Most
Speech	(Non-verbal)	(Limited verbal)	Highly Verbal
Reading	(Non-reader)	Some reading	Fluent reader
Complies with simple instructions	Rarely	Sometimes	(Usually)

What tools does your child use to communicate?

Social Stories (Visual Schedules) (iPad) (Pictures)

Other physical gestruring and some words

Version 2.0

Which activities can your child do on their own?

(Toileting) (Toothbrushing) (Bathing) some assistance Hair brushing (Dressing)

What are your child's strengths?

humor, play, all gross motor skills good, helper

What are your child's interests?

Books, music, TV, water activities

Is your child sensitive to any of the following?

Loud Noises Bright Lights Unfamiliar Smells (Unfamiliar Tastes)

Other _____

What are the best rewards for your child?

(Pad/tablet time) Prize/trinket from dentist (Special food/~~meal~~) Special outing

Other _____

What kind of treatment would you like our team to provide?

(Routine Exam) (Cleaning) Filling/Crown Extractions A lot of work Orthodontics

What would be your preferred way to accomplish your child's care?

- ☐ Desensitization/Behavioral Approach
- ☒ Sedation/General Anesthesia ¥
- ☐ Restraint/Protective stabilization
- ☐ Other, Describe

How did your child's last dental visit go? What could have made it easier?

good would like more info before procedure starts (a previous dentist extracted 4 teeth without telling us first aftercare for extraction very difficult with his challenges resulting in abcess)

Is there anything else that you would like us to know about your child?

he can be physical because he's scared or mad. Dad is the best calmsy tool

For office use only			
Type of exam		RC	(NP)
Room	(QR)	Semi	Open
Time (min)	30	(40)	60

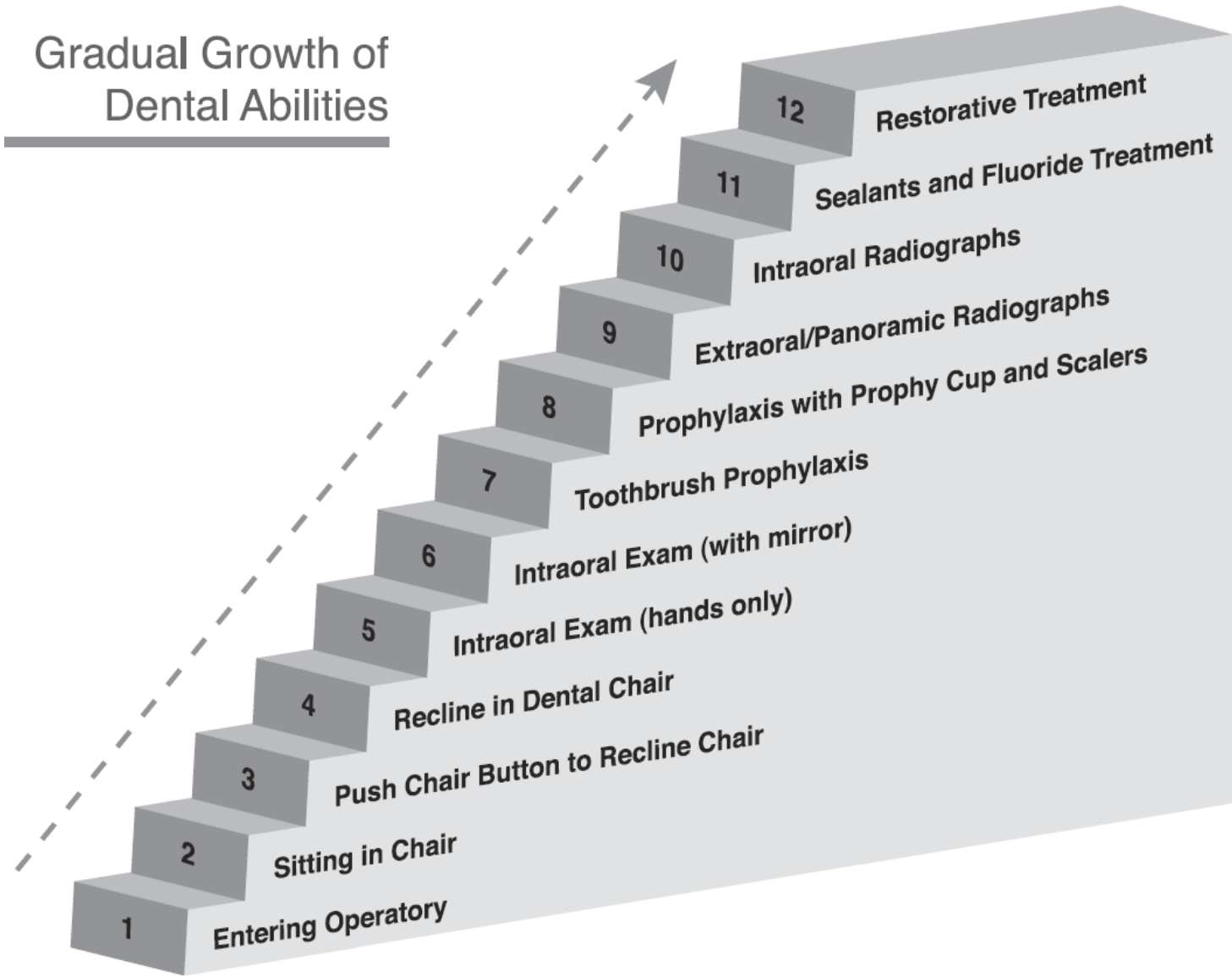
Thank you for completing this form. The information will be used to help your child with dental treatment

Version 2.0

Initial Interview

Tips and Techniques

Gradual Growth of Dental Abilities



Modeling

The Center for Pediatric Dentistry,
Dental Home Day, 2015

The Center for Pediatric Dentistry,
Dental Home Day, 2015

Dental Stories

“Show me how to do something rather than just telling me. And please be prepared to show me many times.”

Ten Things Every Child With Autism Wishes You Knew, Ellen Notbohm, 2005
Image: Farmer’s Almanac

Home -The Center for Pediatri...

https://thecenterforpediatricdentistry.com

Search

the center for pediatric dentistry

A PARTNERSHIP OF University of Washington & Seattle Children's

Washington Dental Service Building

SCHOOL OF DENTISTRY
UNIVERSITY of WASHINGTON

Seattle Children's
HOSPITAL • RESEARCH • FOUNDATION

Search The Center

For Parents/Caregivers | For Professionals | For Students | About The Center

The **University of Washington Center for Pediatric Dentistry** is dedicated to providing the best quality dental education and services to improve the dental health of children ages birth through 18 and children with special needs ages birth through 20. When you come to the Center, you will find:

- Preventive Care (examinations, cleanings, sealants)
- Restorative Care (fillings, stainless-steel crowns)
- Sedation and general anesthesia
- Social work (to help arrange transportation and assist with financial aid)
- Staff specially trained in serving children with special needs, such as those with Autism Spectrum Disorder and Down Syndrome, or complex medical issues
- Access to translation services (120 languages)
- Convenient location at Magnuson Park, with free parking and on a METRO transit line

Call 206-543-5800 or

MAKE AN APPOINTMENT

- Get directions
- Meet our care providers
- Prepare for the first visit
- Learn why early intervention is important

Read our Patient Appointment Policy (PDF), effective 1/1/15

Location

6222 NE 74th St.
Seattle, WA 98115
Get directions ›

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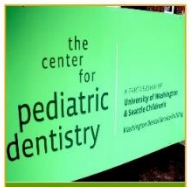
8/28/2015

My Visit to the Dentist
Social Story

Instructions: Read the social story with your child to learn the routine. Your child may also read the story independently.

Today I am going to the dentist. My family and I will walk to a large brick building.

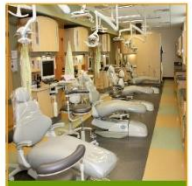


The dentist helps keep my teeth clean and healthy.

I will check in at the front desk.

I will have a seat in the waiting room. There are toys there for me to play with.

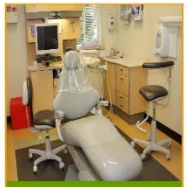
When my name is called I will walk through a door and down a long hallway to see the dentist.



I will walk by rows of big chairs. One of them will be mine to sit in.

My Visit to the Dentist
Social Story

Instructions: Read the social story with your child to learn the routine. Your child may also read the story independently.



I will sit in a big chair. It will move and lean back. I have to sit still so the dentist can look at my teeth.

My dentist will say Hi to me and ask me to sit down in the chair.

My dentist has to wear a mask, gloves, glasses and a special coat to get ready to look at my teeth.

The dentist will check my teeth with special instruments.

I will open my mouth wide for the dentist to see.

I did a great job at the dentist, and now it is time to leave!

iPhone

ARTICLE

ABSTRACT

Purpose: To investigate caregivers' preference regarding dental stories to prepare children with autism for dental visits.

Methods: Caregivers of children with autism were allowed use of dental stories available via different media (paper, tablet computer, computer) and image types (comics or drawings, photographs, video). Caregivers completed pre- and postintervention surveys. Fisher's exact tests were used to determine associations between predictive factors and preferences.

Results: Forty initial and 16 follow-up surveys were completed. Subjects were primarily male (85%). Mean child age was 6.7 years. Nine (64%) caregivers found the dental story useful for themselves and their child. Two (14%) caregivers found the aid only helpful for themselves. Preferred media type was associated with language understanding ($p = .038$) and home media preference ($p = .002$).

Conclusions: Practitioners should consider using dental stories to help prepare families and children for dental visits. Individual preferences for dental stories vary; using prior history can aid in selection.

KEY WORDS: autism, social story, dental story, behavior management

Dental stories for children with autism

Ian W Marion, DDS, MS;[1]* Travis M. Nelson, DDS, MSD, MPH;[2] Barbara Sheller, DDS, MSD;[3] Christy M. McKinney, PhD, MPH;[4] JoAnna M. Scott, PhD[5]

[1]Clinical Assistant Professor, College of Dentistry, University of Illinois, Chicago, Illinois; [2]Clinical Assistant Professor, University of Washington School of Dentistry, Washington; [3]Pediatric Dentistry Division Chief, Seattle Children's Hospital, Washington; [4]Clinical Assistant Professor, University of Washington School of Dentistry, Washington; [5]Acting Assistant Professor, University of Washington School of Dentistry, Washington.

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Spec Care Dentist 36(4): 181-186, 2016

Introduction

The diagnostic criteria for Autism Spectrum Disorder (ASD) include deficits in social communication, difficulty developing relationships, and altered responses to sensory stimulus.[1] Providing dental care to pediatric patients with ASD therefore presents a myriad of challenges to providers. Individuals with ASD may not cope with routine social situations, let alone one that is perceived as stressful and invasive, such as a dental visit. Traditional behavior management in pediatric dentistry is often dependent upon the ability to communicate.[2] Therefore, when caring for patients with communication difficulties, the effectiveness of many behavioral techniques is reduced or eliminated.

In addition to challenges in receiving care, sensory hyperresponsiveness, intellectual impairment, and inconsistent home hygiene routines can contribute the oral health challenges faced by those with ASD.[3] Children with autism tend to have poorer oral hygiene than typically developing peers and may be at increased risk for dental caries.[4,5] Reducing caries risk and facilitating dental care in this population is an important public health goal, given the prevalence of individuals with ASD is increasing.[6] Because of behavioral difficulties, general anesthesia (GA) often becomes the treatment of choice for patients with ASD who require extensive dental treatment.

However, the parents of children with ASD tend to prefer more basic and less invasive techniques to more advanced or invasive techniques such as GA.[7] In addition, treatment under GA is costly and poses medical risks to the child. Therefore, there is much to be gained by providing preventative dental care for those with ASD in the traditional dental clinic setting.

Many strategies are proposed to facilitate dental care for patients with ASD. These include desensitization,[8] creating an environment designed to be minimally stimulating,[2] structured appointments,[9] and visual pedagogy.[11] Unfortunately, none of these strategies are completely effective in securing cooperation.

Social StoriesTM are a behavioral intervention used for children with ASD. Social StoriesTM generally consist of a short sequence of pictures and sentences describing a situation.[12] They are often used to generate a desired behavior, eliminate an undesirable one, or prepare a child for a new experience. Like other behavior management techniques, they are not effective for every patient, though they are relatively inexpensive, simple to use, and can generate a positive result.[13] Social StoriesTM have been shown to be useful in affecting nondental behavioral changes for about 60% of children with ASD,[12] and this level of success may therefore be achievable with similar types of preappointment training tools. However, there is considerable variability in individual response to these interventions, indicating a need to understand how they are best applied.[13] Simple training tools are not just potentially useful, but have also been shown to be well accepted by families that have used them.[14]

More recently, technology has been used along with preparation aids to facilitate positive behavior in children who have ASD. Screen media[15] and tablet computers[16] have recently been implemented with varying degrees of success. Technology may be more accessible to some children and can be employed to leverage the success of traditional Social StoriesTM. Visual pedagogy is a similar technique that incorporates sequential photographs of a desired behavior. It has been used effectively to improve behavior in the dental office and home oral hygiene routines.[11,17] Visual pedagogy has been combined with more basic behavior guidance techniques to improve cooperation with dental examination.[18]

Children with ASD are not a homogenous population, and individuals will likely respond differently to interventions. Given the diversity of patients, and the variety of tools available to prepare for a dental visit, providers are faced with the challenge of determining which is most appropriate for each individual. The aim of this study is to investigate preferences of parents of children with ASDs for different types of dental stories. Identifying preferences could prepare children with ASD for dental appointments can lead to more successful oral examinations, which may in turn lead to improvement in oral health.

Methods

Subjects

We enrolled patient and caregiver dyads seeking treatment at the University of Washington pediatric dentistry clinic. The patient was required to have a diagnosis of ASD and be between the ages of 1 to 18 years old. New patients presenting for an initial visit were identified as potential subjects based on medical history information provided prior to the visit. Written informed consent was obtained from the caregivers, and when feasible assent was obtained from patients. The University of Washington institutional review board approved the study.

Dental stories

A "dental story" consisting of 12 photographs and corresponding text was developed for use at a university based pediatric dental clinic (Figure 1). A video dental story that mirrored the text and images of the photograph story was then created. Links to both versions were made available through the clinic's webpage. Research Protocol: Caregivers were approached at the initial visit and invited to participate in the study. A 29-question

Figure 1. Sample photograph dental story.

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DOI: 10.1111/scd.12187

Marion IW, Nelson TM, Sheller B, McKinney CM, Scott JM. Dental stories for children with autism. Spec Care Dentist. 2016 Jul;36(4):181-6.

Be Consistent:
Try and Keep Room,
Assistant, Dentist the Same
at Each Visit

Practice, Practice, Practice

Use the Same Exam Sequence at Home and Office

Example:

- touch lips with the mirror (count to 5)
- touch right cheek mucosa (count to 5)
- touch left cheek mucosa (count to 5)
- touch tongue (count to 5)
- have the patient open wide with the mirror above the tongue (count to 5 four times, once for each quadrant)

Audiovisual Distraction

Effectiveness of audiovisual distraction in behavior modification during dental caries assessment and sealant placement in children with autism spectrum disorder.Dent Res J (Isfahan). 2017 May-Jun;14(3):177-182.

Props and Tools

Office Setup

- Avoid bright lights and stimulating office design in areas intended for CSHCN
- Avoid using strong flavors and odors in fluoride, prophy paste, and other dental products
- Keep instruments covered

Appointment Design

- Schedule short appointments (15-20 min)
- Divide procedures into discrete parts
- Attempt to schedule patient with the same provider, assistant, room
- Establish a routine, document it, and adhere to it

ARTICLE

ABSTRACT

Purpose: Autism Spectrum Disorder (ASD) is a condition which most dentists will encounter in their practices. Contemporary educational and behavioral approaches may facilitate successful dental care.

Methods: A literature review was conducted for relevant information on dental care for children with ASD.

Results: Educational principles used for children with ASD can be applied in the dental setting. Examples include: parent involvement in identifying strengths, sensitivities, and goal setting; using stories or video modeling in advance of the appointment; dividing dental treatment into sequential components; and modification of the environment to minimize sensory triggers. Patients with ASD are more capable of tolerating procedures that they are familiar with, and therefore should be exposed to new environments and stimuli in small incremental steps.

Conclusions: By taking time to understand children with ASD as individuals and employing principles of learning, clinicians can provide high quality dental care for the majority of patients with ASD.

KEY WORDS: autism, behavior, desensitization, dentistry

Educational and therapeutic behavioral approaches to providing dental care for patients with Autism Spectrum Disorder

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[1]Clinical Assistant Professor, Department of Pediatric Dentistry, University of Washington, Seattle, Washington; [2]Chief of Pediatric Dentistry and a staff orthodontist, Seattle Children's Hospital, and Affiliate Professor, Department of Orthodontics; [3]Department of Pediatric Dentistry, University of Washington, Seattle, Washington; [4]Adjunct Clinical Professor, Department of Pediatric Dentistry, Schulich School of Medicine and Dentistry, London, Ontario, Canada; [5]Associate Professor, Department of Psychiatry; [6]Department of Educational Psychology, University of Washington, Seattle, Washington. *Corresponding author e-mail: tmnelson@uw.edu

Spec Care Dentist 35(3): 105-113, 2015

Introduction

Autism Spectrum Disorder (ASD) is a complex, neurodevelopmental disorder which affects between 1 in 68 and 1 in 50 American children. Over 700,000 American children have been diagnosed with ASD.[1-3] This condition occurs throughout the world in all racial, ethnic, and socioeconomic groups, and is almost five times more likely to occur in boys than girls.[2,4]

The diagnosis of ASD is made by specialists who interview a patient's parents and caregivers, observe patient behavior, and perform educational and psychological testing. Diagnosis is based on impairments in the domain of social communication and the presence of restricted/repetitive interests and behaviors. Symptoms are typically observable before 2 years of age, and reliable diagnosis is possible at approximately this same time.[5,6] Early diagnosis is critical, as early initiation of therapy has been shown to be one of the strongest predictors of treatment outcomes for children with ASD.[7]

The Diagnostic and Statistical Manual of Mental Disorders, 5th Edition, (DSM-5), provides the most current diagnostic criteria, underscoring the presence and absence of behaviors in both domains.[8] (Table 1). Individuals with ASD may present with varying combinations of symptoms and symptom severity within each domain. When combined with increased rates of a range of comorbid disorders, such as intellectual disability, seizures, anxiety, and Attention Deficit Hyperactivity Disorder (ADHD), each individual with ASD presents with a unique constellation of behaviors and challenges that providers must address.

Current evidence suggests that ASD results from a complex interplay of genetic and environmental factors. Epidemiologic studies indicate that environmental factors such as toxic exposures, teratogens, perinatal insults,

All authors contributed to the manuscript concept and content, including drafting the article and revising it critically.

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How Effective is this Approach?

ADA CE Program ARTICLE 1

COVER STORY

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

Travis Nelson, DDS, MSD, MPH; Amelia Chim, DDS, MSD; Barbara L. Sheller, DDS, MSD; Christy M. McKinney, PhD, MPH; JoAnna M. Scott, PhD

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.

JADA 2017:148(7):485–492

http://dx.doi.org/10.1016/j.adaj.2017.03.015

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.[2,3]

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

This article has an accompanying online continuing education activity available at: http://jada.ada.org/co/home.

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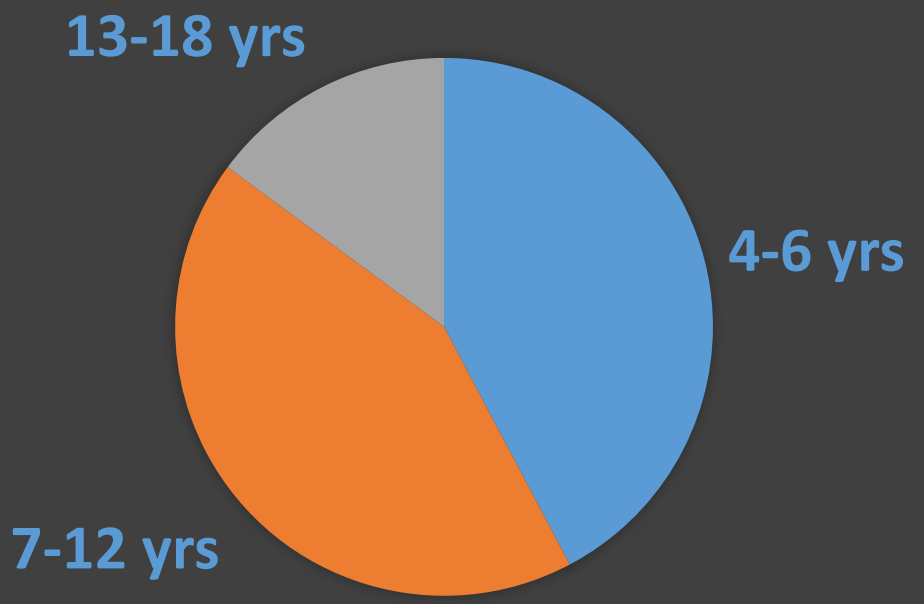
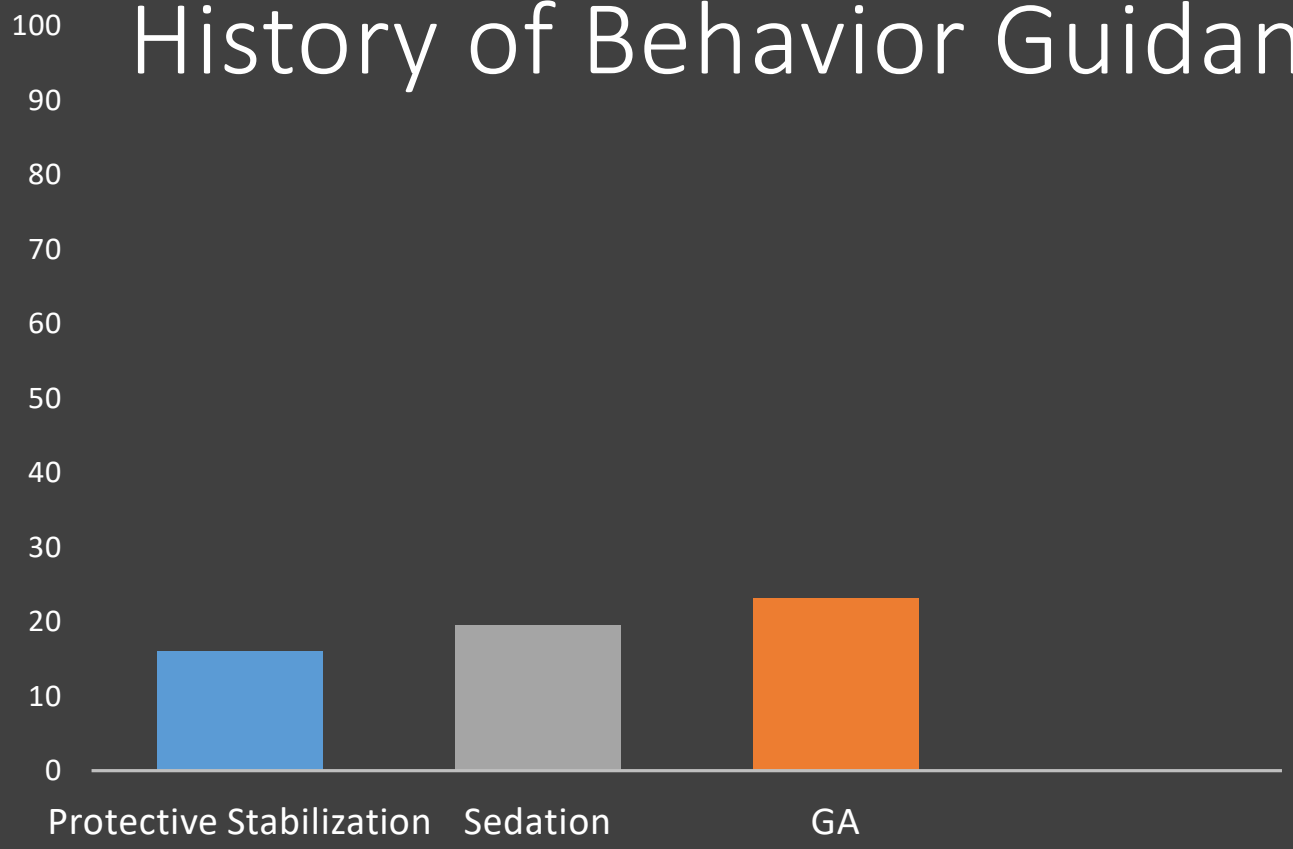
- Jan 2012-Jan 2015
- 168 children
- 34 Question survey

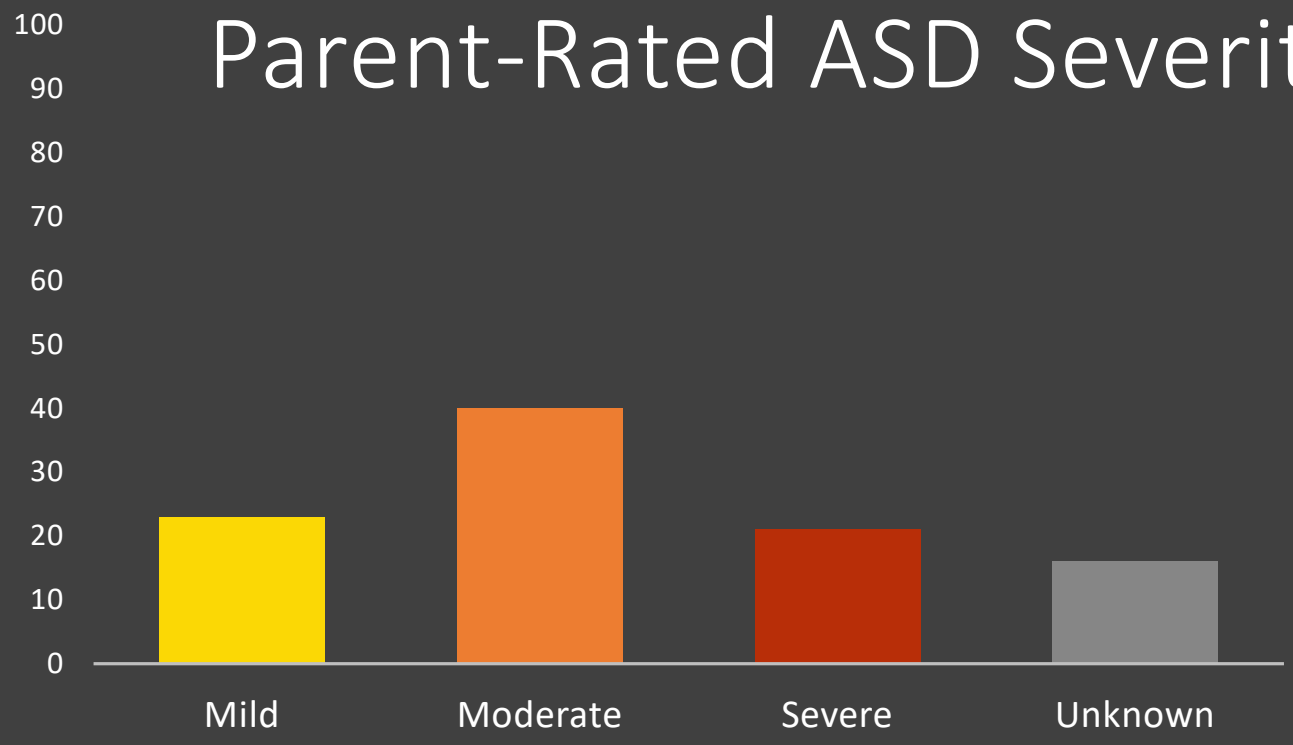
AGE



History of Behavior Guidance

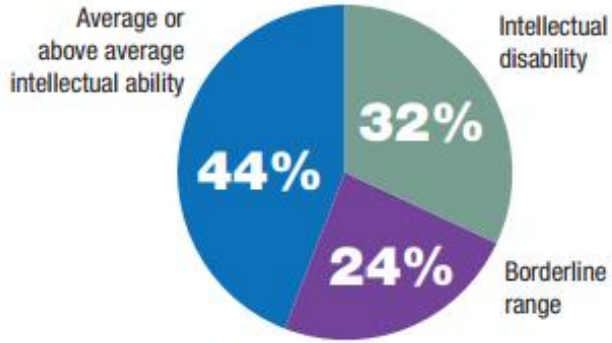


Parent-Rated ASD Severity



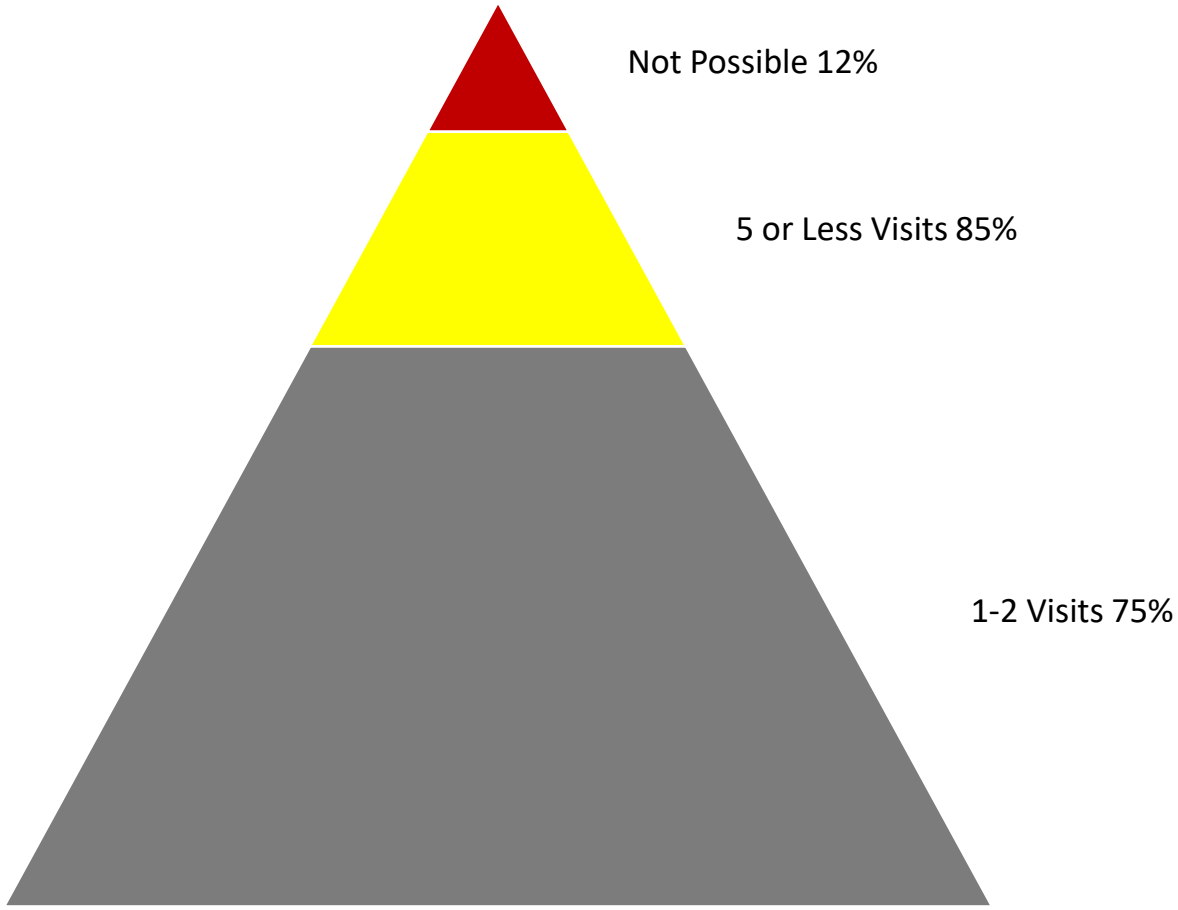
What was the intellectual ability of the children identified with ASD?

Among children identified with ASD who had IQ scores available, about a third also had intellectual disability.

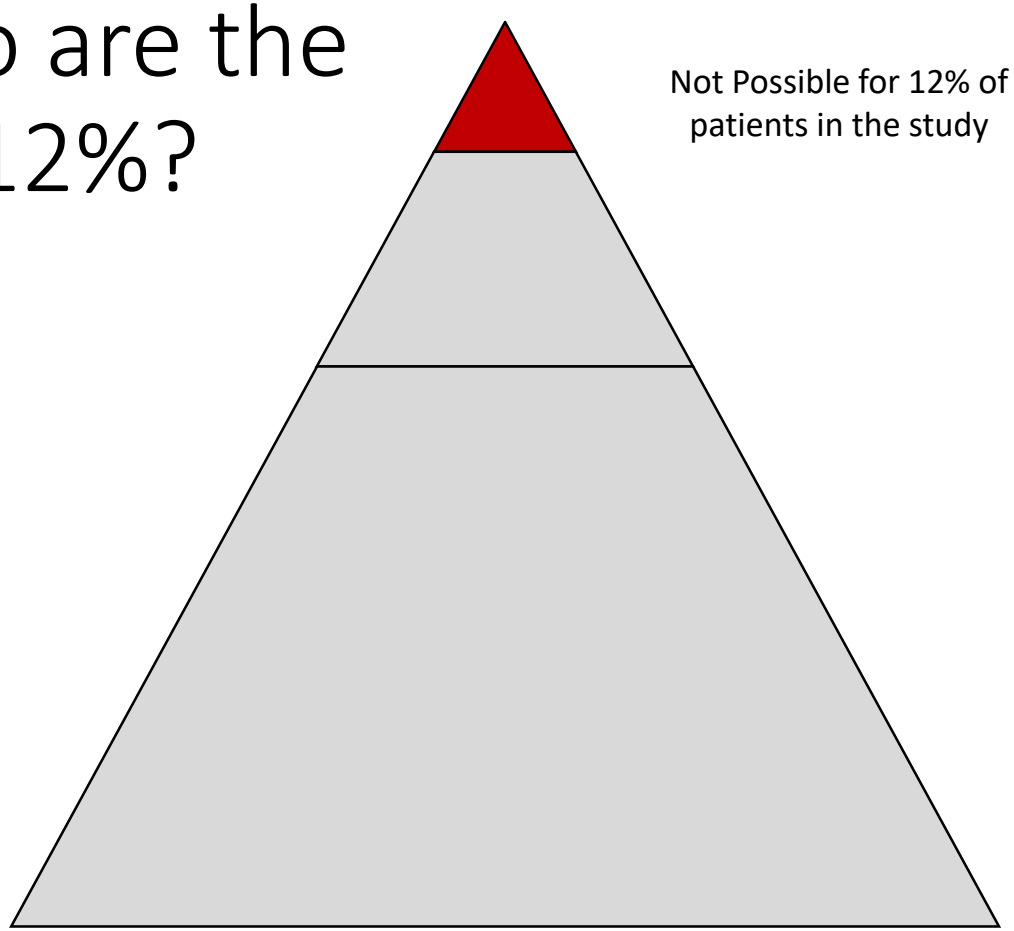


* Based on information from the 9 ADDM Network sites that had intelligence quotient (IQ) scores available for at least 70% of children identified with ASD. Intellectual disability defined as IQ score ≤70.

Ability to Receive Exam



Who are the 12%?



- “Severe” parent-rated severity
- Non-verbal with minimal language understanding
- Unable to dress themselves
- Unable to involve themselves in group activities

Over 95% of children with mild to moderate ASD severity received dental examination

77% of with ASD rated as severe allowed an exam

Follow-Up:

- 137 of 168 original participants
- All follow-up participants were those who had achieved a minimum threshold exam (MTE)
- Assessed:
  - If MTE was maintained
  - Additional dental skills achieved during 2 year follow-up

PEDIATRIC DENTISTRY V 41 / NO 5 SEP / OCT 19

CASE SERIES

Children with Autism Spectrum Disorder Are Able to Maintain Dental Skills: A Two-Year Case Review of Desensitization Treatment

Quinn Yost, DDS, MSD[1] • Travis Nelson, DDS, MSD, MPH[2] • Barbara Sheller, DDS, MSD[3] • Christy M. McKinney, PhD, MPH[4] • William Tressel, BA[2] • Amelia N. Chim, DDS, MSD[5]

Abstract: *Purpose:* *The purposes of this study of children with autism spectrum disorder (ASD), who had successfully accepted a dental examination seated in a dental chair following desensitization interventions, were to: (1) determine if ability to accept an examination was maintained two years following initial success; (2) quantify new dental skills acquired; and (3) analyze the use of advanced behavior guidance techniques.* ***Methods:*** *This retrospective two-year case series included 138 ASD children. Data were obtained from dental records. Descriptive statistics were calculated, and Fisher's exact test was used for comparisons of interest.* ***Results:*** *Most children (92 percent) maintained the ability to receive minimum threshold examinations once the initial exam had been achieved. New basic dental skills attained by most children included receiving toothbrush prophylaxis (83 percent) and accepting fluoride varnish (77 percent). Few children required oral sedation or protective stabilization, but 22 percent received general anesthesia.* ***Conclusions:*** *Most children with autism spectrum disorder who learned to accept an examination maintained that skill over time, and many accepted toothbrush prophylaxis and fluoride varnish. Sensory-invasive skills, such as radiographs and rubber cup prophylaxis, were acquired with lower frequency. Therefore, when treating ASD patients, it is important to consider that some will require advanced behavior guidance techniques.* *(Pediatr Dent 2019;41(5):397-403) Received March 11, 2019 | Last Revision June 26, 2019 | Accepted June 30, 2019*

KEYWORDS: AUTISTIC DISORDER, PEDIATRIC DENTISTRY, SPECIAL-CARE DENTISTRY

Autism Spectrum Disorder (**ASD**) is a lifelong developmental disability that affects one in 59 children.[1] ASD patients have deficits in social interaction and communication and restrictive, repetitive patterns of behavior.[2] These aspects of ASD can make dental appointments unpredictable. Consequently, the unmet dental need in the ASD community is 12 to 15 percent, compared to five to seven percent for typically developing children.[3-5] The challenging behavior of ASD children often results in use of advanced behavior guidance techniques (**ABGTs**), such as protective stabilization, oral sedation, and general anesthesia to provide dental care.[6-8]

In recent years, several behavior management techniques from the educational setting have been adapted for dental care.[2,8,9] The goal of these methods is to help ASD children learn the skills necessary to receive oral care. Treatment protocols that have been employed include: visual preparation aids[10-13]; applied behavior analysis[2]; developmental individual differences; relationship-based approaches[14]; treatment and education of autistic and related communication-handicapped children[15]; individualized reinforcement[16,17]; sensory adapted dental environments[18]; and progressive desensitization with individualized reinforcement.[19] Due to the wide-ranging presentation of ASD; clinicians treating ASD children should involve the patient's family in therapy when possible.[20]

Many ASD children can learn to accept dental examination through implementation of dental-oriented teaching protocols that employ progressive desensitization with individualized reinforcement.[19] In a previous report from our clinic describing a case review of 168 ASD children participating in a dental desensitization program, 87.5 percent of children successfully received minimum threshold exams (**MTE**), defined as an examination with an intraoral mirror while seated in a dental chair.[19] The research suggests that dental desensitization provides an avenue for some ASD children to receive their first successful MTE; however, it is unknown if the ability to accept a visual dental examination while seated in a dental chair is maintained over time.

The purposes of this study of children with autism spectrum disorder, who had successfully accepted a dental examination seated in a dental chair following desensitization interventions, were to: (1) determine if ability to accept an examination was maintained two years following initial success; (2) quantify new dental skills acquired; and (3) analyze the use of advanced behavior guidance techniques of general anesthesia, oral sedation, and/or protective stabilization during the study period.

Methods

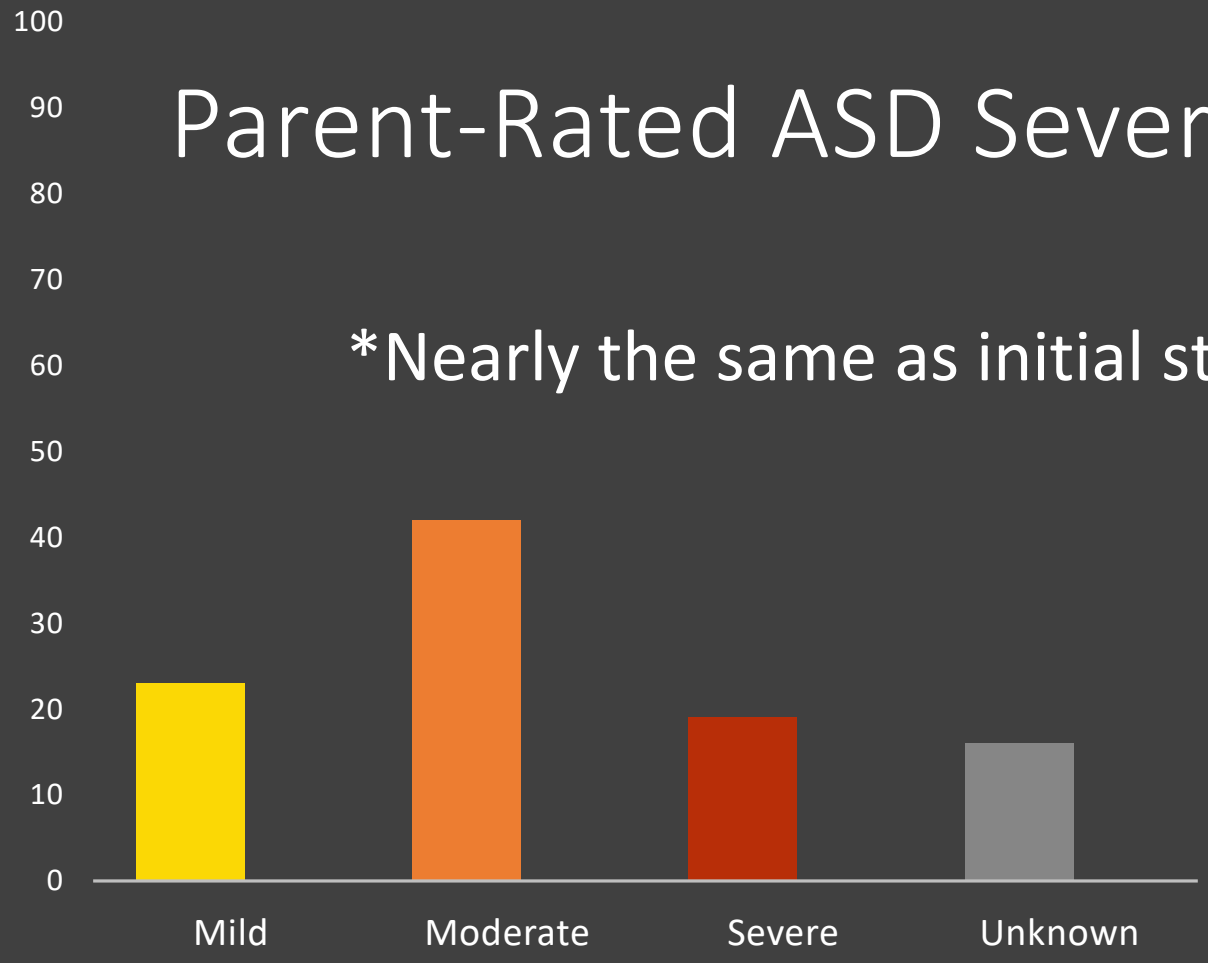
Study design and sample. This retrospective case series consisted of 138 children who participated in a dental desensitization program for ASD children at the University of Washington's

[1]Dr. Yost is in private practice, Torrance, Calif., USA. [2]Dr. Chim is in private practice, and an affiliate assistant professor, and [3]Dr. Nelson is a clinical associate professor, both in the Department of Pediatric Dentistry; and [4]Dr. Tressel is a PhD student, Department of Biostatistics; all at the University of Washington, all in Seattle, Wash., USA. [5]Dr. Sheller is division chief, Department of Pediatric Dentistry; and [6]Dr. McKinney is an associate professor, Department of Craniofacial Medicine, both at the Seattle Children's Hospital, Seattle, Wash., USA.
Correspond with Dr. Yost at quinnyostdds@gmail.com

HOW TO CITE:
Yost Q, Nelson T, Sheller B, McKinney CM, Tressel W, Chim AN. Children with Autism Spectrum Disorder Are Able to Maintain Dental Skills: A Two-Year Case Review of Desensitization Treatment. Pediatr Dent 2019; 41(5):397-403.

Parent-Rated ASD Severity

*Nearly the same as initial study



Self Care

- 1/3 could use the toilet by themselves
- 1/5 could dress themselves and/or brush their own hair
- 1/10 could brush their own teeth

*None of these factors were associated with the ability to receive a MTE during the study period

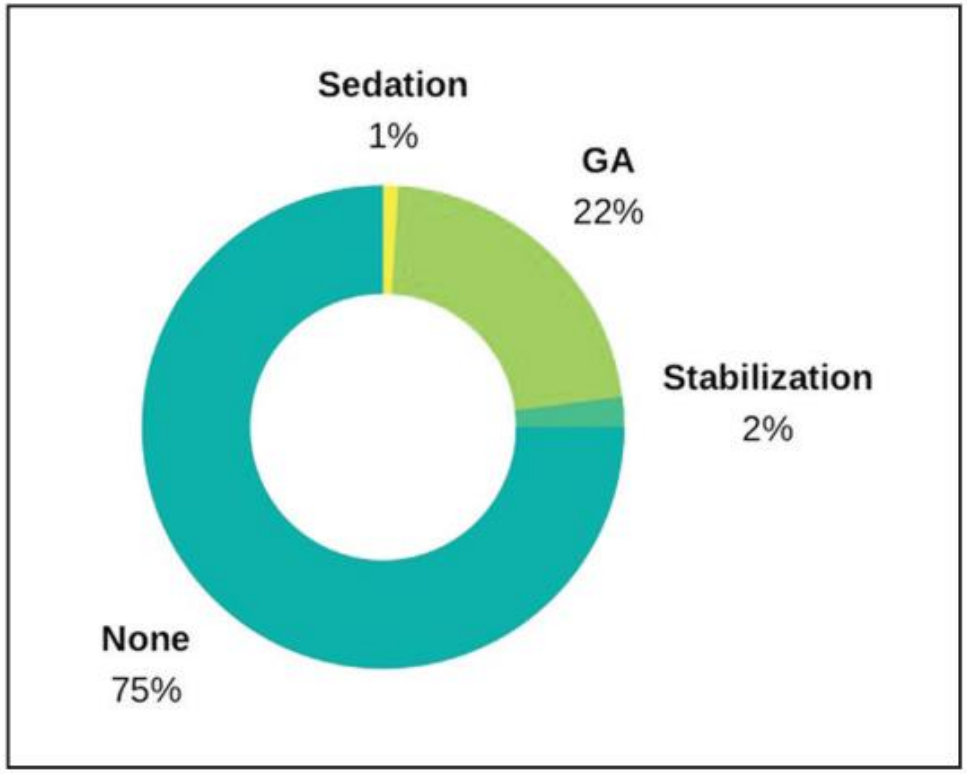
Maintenance of Exam Skill

Over a 2-year period:

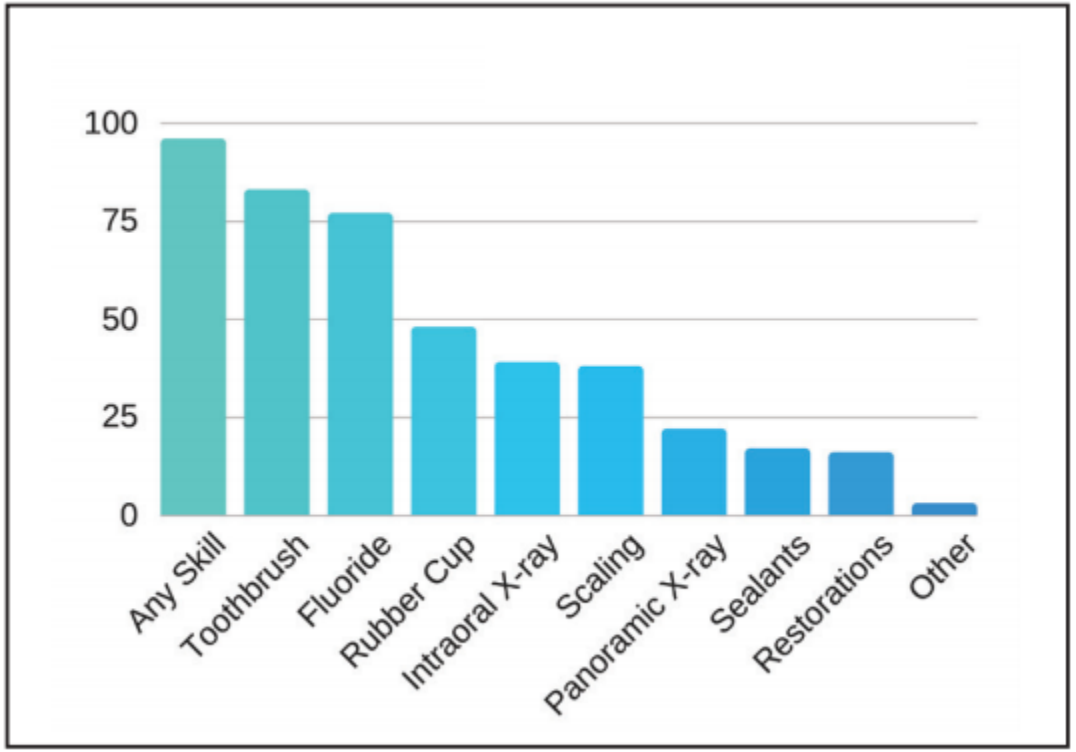
- 80% never lost the skill
- 12% lost, but regained the skill
- 8% lost and never regained the skill

The majority of patients had standard 4-6 month RC intervals, but some had many more visits.

Advanced Behavior Guidance Techniques Used During 2 Year Study Period



New Dental Skills Achieved



Selecting the Right Patients

+

- No obvious dental disease
- Older patient (4+ yrs)
- Mild ID
- History of cooperation in other settings
- Has communication skills
- Performs some self care
- Caregiver engaged

-

- Urgent dental condition
- Precooperative
- Severe ID
- Uncooperative for medical and other visits
- Difficulty communicating with caregiver/provider
- Cannot independently perform any self care
- Caregiver uninterested

“She let the dentist look last time, but won’t allow noisy equipment”

“He is highly verbal”

“We use Social Stories”

“He can brush his own teeth, but needs some help dressing”

“He has severe autism”

“Security guards were needed at his blood draw”

“She has a tendency to get physical when pushed too far”

Should We Just Force an Exam Today?

Factors That Encourage Behavior Modification

- Has received dental care elsewhere = no dental disease
- Good oral hygiene practices
- Minimally cariogenic diet
- Older patient
- Mild intellectual disability
- Tolerates medical exams
- History of learning social skills
- Communicates with caregiver and dental team
- Caregiver interested in pursuing behavioral techniques
- Child able to perform self-care activities

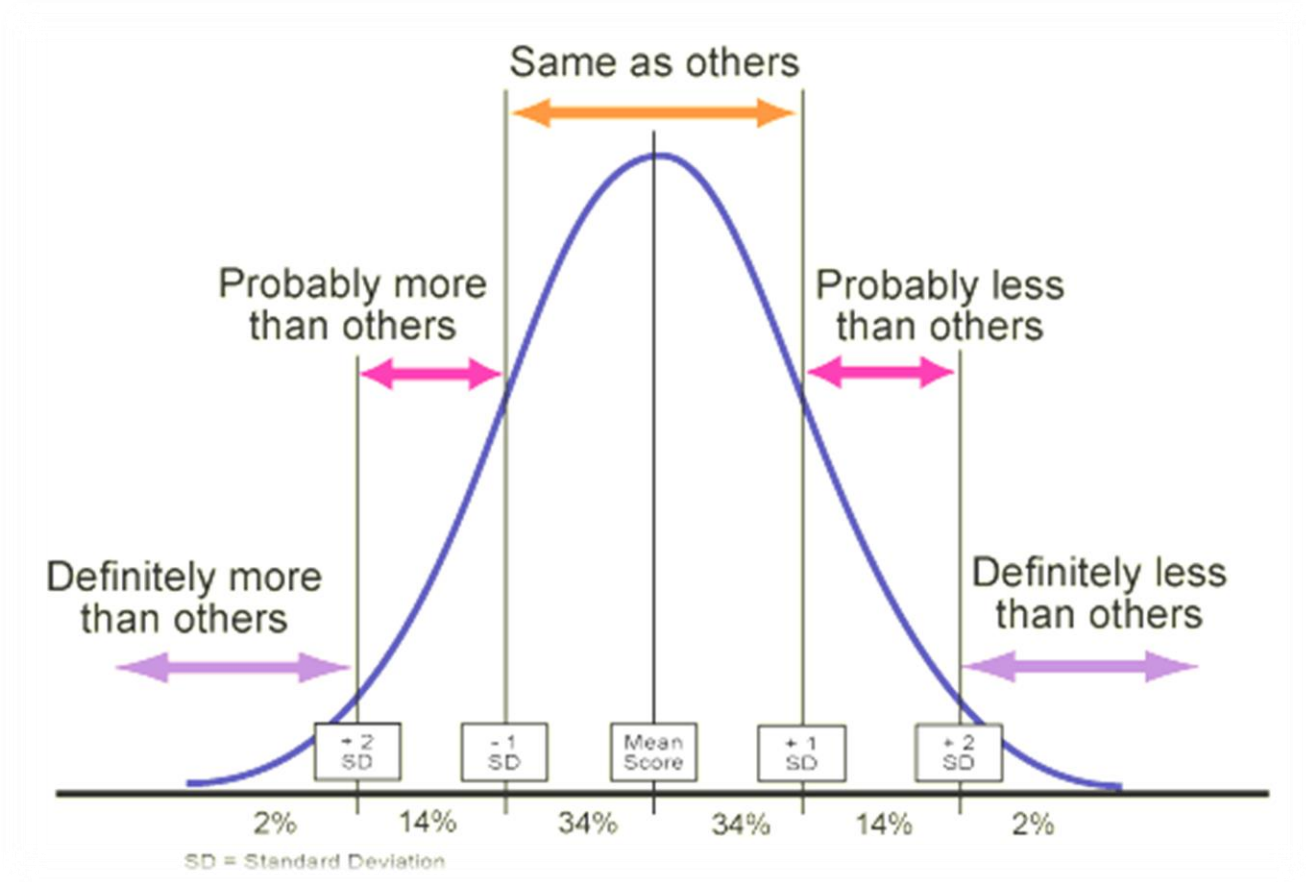
Factors that Encourage Obtaining Exam, Even if Child is Unwilling

- Care aware of urgent dental condition
- Poor oral hygiene
- Highly cariogenic diet
- Pre-cooperative age
- Severe intellectual disability
- Not cooperative for other medical visits
- Extreme difficulty communicating with caregiver/dental team
- Caregiver uninterested in behavioral techniques
- Child cannot independently perform self care

Cost

Pharmacological Management

Conscious Sedation is an Oxymoron



Sedation Definitions

Table 1
Definitions of sedation (effective 01/01/2001) adapted from the American Society of Anesthesiologists and Joint Commission on Accreditation of Healthcare Organizations

Minimal Sedation "Anxiolysis"	Moderate Sedation "Conscious Sedation"	Deep Sedation/Analgesia	General Anesthesia
Responds normally to verbal stimulation	Responds purposefully to verbal commands, alone or accompanied by light tactile stimulus	Patient cannot easily be aroused, but responds purposefully following repeated or painful stimulation	Drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation
Cognitive function and coordination may be impaired	No interventions are required to maintain a patent airway, spontaneous ventilation is adequate	Ability to independently maintain ventilatory function may be impaired; may require assistance in maintaining a patent airway—spontaneous ventilation may be inadequate	Ability to independently maintain ventilatory function is often impaired; often require assistance in maintaining a patent airway
Ventilatory and cardiovascular functions unaffected	Cardiovascular function is usually maintained	Cardiovascular function is usually maintained	Cardiovascular function may be impaired
Typical of patients sedated with N_2O/O_2	Intended level for most dental oral sedation	Typical of patients who are "oversedated" in the dental office	

Data from The Joint Commission. Comprehensive accreditation manual for hospitals: The official handbook. Oakbrook Terrace, IL: Joint Commission Resources; 2011; and The Joint Commission. Revisions to anesthesia care standards. Comprehensive accreditation manual for ambulatory care. Oakbrook Terrace, IL: Joint Commission Resources 2012.

Nelson T, Nelson G. The role of sedation in contemporary pediatric dentistry. Dent Clin North Am 2013;57(1):145-61

- N2O/O2 at less than 50%, when used alone is generally minimal sedation
- N2O/O2 at >50% with additional sedation agents has the potential to result in moderate/deep sedation

*when >50% or with other agents moderate guidelines should be followed

ASA Physical Status Classification

STATUS	DISEASE STATE	EXAMPLES
I	Healthy, normal child	
II	Child with mild systemic disease	Controlled asthma, controlled diabetes
III*	Child with severe systemic disease	Active wheezing, diabetes mellitus w/ complications, heart disease that limits activity
IV*	Child with severe systemic disease that is a constant threat to life	Status asthmaticus, severe BPD, sepsis
V*	Child who is moribund and not expected to survive without the procedure	Cerebral trauma, pulmonary embolus, septic shock

Sedation for CSHCN

Enteral Sedation

Advantages:

- Well tolerated by children who take pills/liquid
- Permitting is more straightforward for the dentist

Disadvantages:

- Subject to 1st pass metabolism
- Unpredictable level of sedation (too little…too great)
- Re-dosing for titration is not advised

Parenteral Sedation

Advantages:

- Predictable blood serum levels
- Allows titration and rapid induction

Disadvantages:

- IV access may be difficult to achieve (especially with CSHCN)
- Provider skill/permitting limitations
- Lower margin for error

Why Do We Sedate?

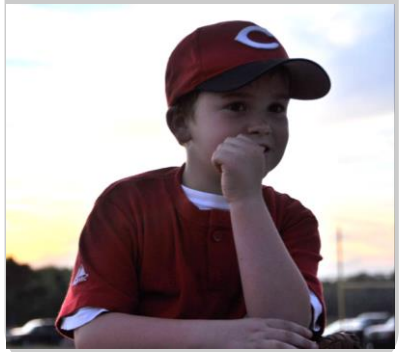
Analgesia
Anxiolysis
Amnesia

3 Types of Sedations

Young patient who is unlikely to cooperate

Young cooperative child with Extensive Needs

Anxious patient with questionable behavior



May be for different reasons than other children you treat using sedation

The Key Is Picking The Right Cases

Preoperative Sedation Checklist

Patient Name:_____ **Chart #**_____ **Sex**: M/F **Age**: _____ **Date** _____

Primary Reason for Sedation: History of Failure with Basic Behavior Guidance Excessive Fear/Anxiety
Young Age Extent of Tx Necessary To Protect Psyche Distance Traveled

Medical History/Review of Systems:

Allergies_____

Current Medications_____

Relevant Diseases_____

Cardiac_____

Pulmonary/Respiratory_____

Contraindications:

Obesity	**Severe Macroglossia**
Snoring	**Limited Oral Opening**
Micrognathia	**Hx. Of Premature birth**
Hx. Recurrent respiratory infections	
Hx. Frequent nose bleeds	

Past History of Sedation/General Anesthesia_____

Result of Medical Consultation (ASA II patients) _____

For females aged 12 and older *pregnancy testing brochure* provided Yes No

Cost of sedation (*N2O, Non-IV Conscious Sed, Beh Mgmt codes*) discussed with family Yes No

Selection Criteria (must answer YES to all questions)

ASA Classification: I or II (med consult indicated) Yes No

Brodsky I or II airway Yes No

Patient Age >2yrs Yes No

Able to obtain radiographs (except in cases of limited treatment/extraction) Yes No

Parents/Clinician believe child will swallow medications Yes No

Treatment will be accomplished in 2 or fewer sedation appointments Yes No

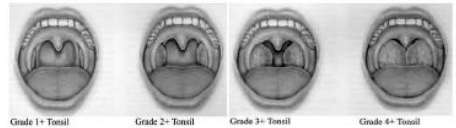
_____

Is this patient a candidate for in-office sedation? Yes No

Attending Signature_____

Resident Signature _____

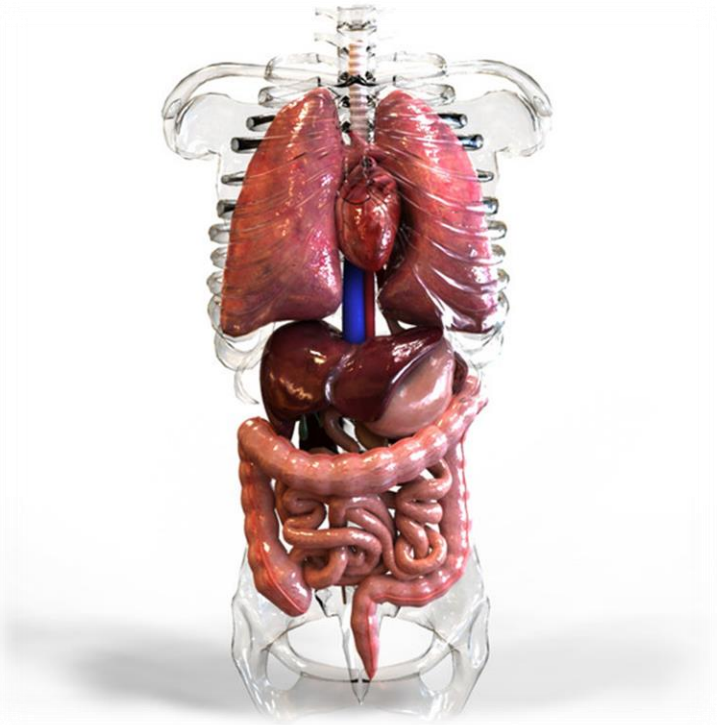
Brodsky Classification



Mallampati Classification

Version 4.0

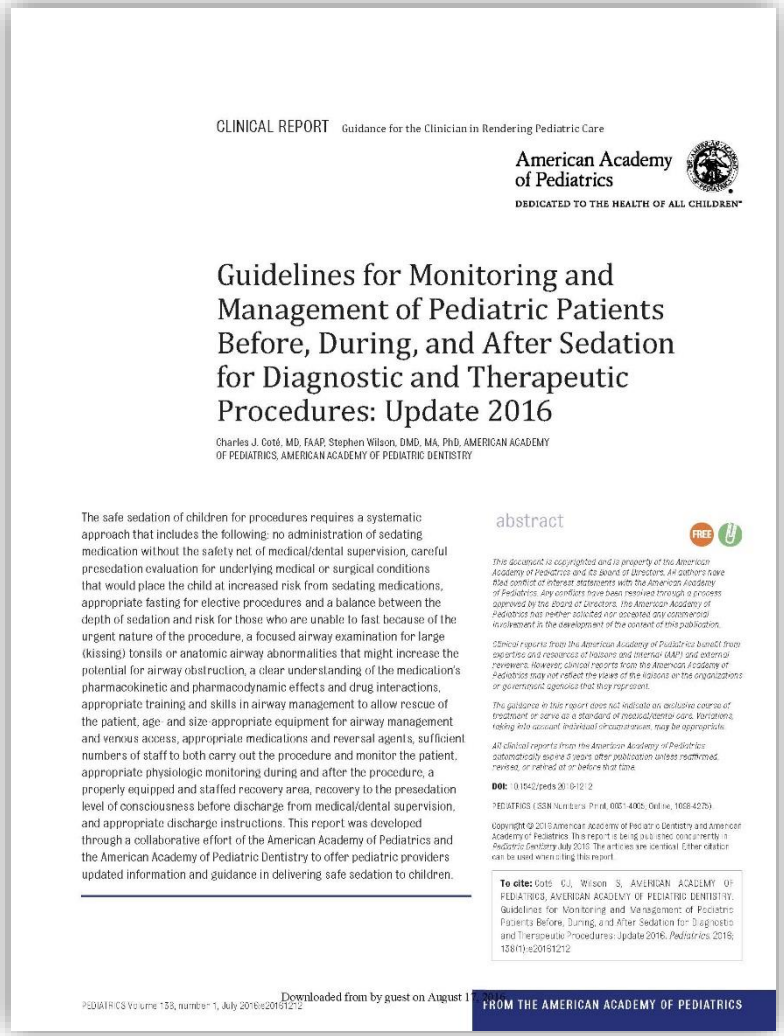
- Diabetes?
- Asthma?
- Epilepsy?
- Cardiac Patients?
- Down Syndrome?
- Ketone Utilization Disorder?
- Maple Syrup Urine Disease?



Concerns

- Fasting
- Swallowing medication
- Latent period
- Medical Health
- Pre-Op Evaluation (vitals, airway, etc.)
- Who is this really for (the parent?)

Pre-Visit Behavioral Meds



CLINICAL REPORT Guidance for the Clinician in Rendering Pediatric Care

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

Guidelines for Monitoring and Management of Pediatric Patients Before, During, and After Sedation for Diagnostic and Therapeutic Procedures: Update 2016

Charles J. Coté, MD, FAAP, Stephen Wilson, DMD, MA, PhD, AMERICAN ACADEMY OF PEDIATRICS, AMERICAN ACADEMY OF PEDIATRIC DENTISTRY

The safe sedation of children for procedures requires a systematic approach that includes the following: no administration of sedating medication without the safety net of medical/dental supervision, careful presedation evaluation for underlying medical or surgical conditions that would place the child at increased risk from sedating medications, appropriate fasting for elective procedures and a balance between the depth of sedation and risk for those who are unable to fast because of the urgent nature of the procedure, a focused airway examination for large (kissing) tonsils or anatomic airway abnormalities that might increase the potential for airway obstruction, a clear understanding of the medication's pharmacokinetic and pharmacodynamic effects and drug interactions, appropriate training and skills in airway management to allow rescue of the patient, age- and size-appropriate equipment for airway management and venous access, appropriate medications and reversal agents, sufficient numbers of staff to both carry out the procedure and monitor the patient, appropriate physiologic monitoring during and after the procedure, a properly equipped and staffed recovery area, recovery to the presedation level of consciousness before discharge from medical/dental supervision, and appropriate discharge instructions. This report was developed through a collaborative effort of the American Academy of Pediatrics and the American Academy of Pediatric Dentistry to offer pediatric providers updated information and guidance in delivering safe sedation to children.

abstract

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Fasting

Before Elective Sedation Children undergoing sedation for elective procedures generally should follow the same fasting guidelines as those for general anesthesia

It is permissible for routine necessary medications (eg, antiseizure medications) to be taken with a sip of clear liquid or water on the day of the procedure

Administration

Prescription medications intended to accomplish procedural sedation must not be administered without the safety net of direct supervision by trained medical/dental personnel. The administration of sedating medications at home poses an unacceptable risk, particularly for infants and preschool-aged children traveling in car safety seats because deaths as a result of this practice have been reported.

What Options Are There?

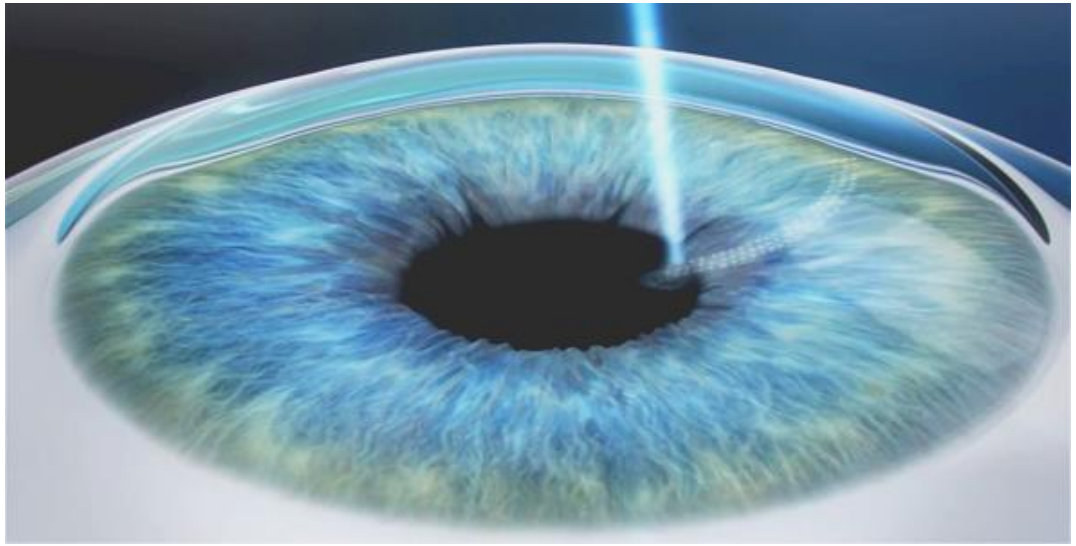
Can Their Physician Write for it?

Regular Behavioral Meds (e.g. risperidone, clonidine)

- Atypical antipsychotic
- Sedation as a side effect

Lorazepam

- Half-life of 14 to 19 hours
- Peak plasma level in 1 to 2 hours
- reported to have significant amnesic properties
- Recommended adult dose is 1 mg to 2 mg



Jackson D.L., and Johnson A.S.: Inhalation and enteral conscious sedation for the adult dental patient. Dent Clin North Am 2002; 46: pp. 781-802

Matear D.W., and Clarke D.: Considerations for the use of oral sedation in the institutionalized geriatric patient during dental interventions: a review of the literature. Spec Care Dentist 1999; 19: pp. 275-280

Diazepam

- Long half-life of 30-60 hours with active metabolites to 100 hrs
- The recommended adult dose is 2 to 10 mg for anxiety

Triazolam

- Used extensively as a sedative agent
- Half-life of 2 to 4 hours
- Reaches peak plasma levels in a relative short time of 1 to 2 hours
- The recommended adult dose is 0.125 to 0.5 mg

Quarnstrom F.W., and Donaldson M.: Triazolam use in the dental setting: a report of 270 uses over 15 years. Gen Dent 2004; 52: pp. 496-501

Midazolam

- Comes in a liquid form
- Half-life is 1 to 2 hours and reaches
- Peak plasma levels in under 1 hour
- Recommended dose is 0.5 mg/kg up to a maximum dose of 20 mg

Jackson D.L., and Johnson A.S.: Inhalation and enteral conscious sedation for the adult dental patient. Dent Clin North Am 2002; 46: pp. 781-802

Route

Effectiveness?

IV or IM midazolam

Dental procedures	N	%
Dental extractions of permanent teeth	40	32.0
Definitive restorations	46	36.8
Temporary restorations	T	10.4
Dental extractions of deciduous teeth	13	10.4
Cyst surgery	1	0.8
Aspiration biopsy	1	0.8
Skin suture	1	0.8
TOTAL	125	100.0

TABLE 1 - *Dental procedures performed (N=40).*

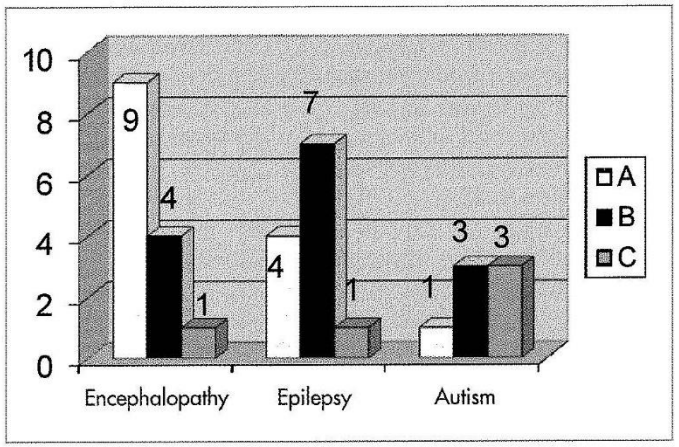


FIG. 2 - *Graph showing the systemic diagnoses of these patients, and their respective behaviours during dental treatment (p<0.05) (N=40).*

A = Did not respond to stimuli
B = Reacted, but allowed treatment
C = Did not allow treatment, needed containment

Capp PL, de Faria ME, Siqueira SR, Cillo MT, Prado EG, de Siqueira JT. Special care dentistry: Midazolam conscious sedation for patients with neurological diseases. Eur J Paediatr Dent. 2010 Dec;11(4):162-4.

Should We Take Normal Behavioral Meds?

Sedation Success

PEDIATRIC DENTISTRY

Clinical Article

CROSS SECTIONAL STUDY

Assessing Temperament as a Predictor of Oral Sedation Success Using the Children's Behavior Questionnaire Short Form

Katherine [illegible], DMD, MSD • Travis M. Nelson, DDS, MSD, MPH • Sarat Thikkurissy, DDS, MS • JoAnne M. Scott, PhD

Abstract: ***Purpose:*** *The purpose of this study was to investigate whether temperament, as measured by the Children's Behavior Questionnaire Short Form (CBQ-SF), was associated with success in oral sedations.* ***Methods:*** *Child-caregiver dyads were enrolled from patients presenting for midazolam, meperidine, and hydroxyzine oral sedation. Children between 36 and 95 months of age, American Society of Anesthesiology (ASA) classification I or II, with diagnostic radiographs, whose parents believed he/she would tolerate oral medications, were enrolled. To assess child temperament, caregivers completed the CBQ-SF. Behavior during sedation and overall sedation results were recorded using the Houpt Behavior Rating Scale. Failure was defined by Houpt overall ratings of fair or worse. The presence of disruptive behavior was also quantified.* ***Results:*** *The sample population consisted of 61 patient-caregiver dyads. The overall sedation success rate was 87 percent (n equals 53). Disruptive behavior was present during 28 percent (n equals 17) of total cases. There was not a significant difference in failure rate or presence of disruptive behavior by age, sex, ASA status, intravenous status, venues for sedation, or type of treatment provided. High impulsivity scores were significantly associated with disruptive behavior (P=.04).* ***Conclusions:*** *Impulsivity may be a determinant of a child's behavior during sedation. (Pediatr Dent 2015;37 [5]:429-35)* Received October 1, 2014 / Last Revision May 14, 2015 / Accepted May 25, 2015

KEYWORDS: SEDATION, TEMPERAMENT, CHILD

Oral sedation and temperament. The true success rate of moderate sedation in pediatric dentistry is difficult to assess from the literature due to wide variation in study design.[1] Members of the American Academy of Pediatric Dentistry reported that 77.3 percent of moderate sedation cases were successful, with success defined as treatment without interruption but allowing for some patient crying or movement.[2] Failed sedation appointments represent a waste of resources both for the dentist and family but, more importantly, may be the source of future dental fear or anxiety for the patient.[3]

A number of factors have been shown to affect sedation success, including gender,[4-6] age,[4,7,8] drug regimen,[9,10] and temperament.[8,11] Variables, such as operator experience, drug regimen, patient selection criteria, and study design, can also affect reported success rates. Apart from those studies that have investigated various pharmacologic regimens, there is relatively little research on factors predicting oral sedation success. One factor that may guide successful case selection is patient temperament.

Over the past 70 years, temperament research has undergone a fundamental transformation. Before the 1960s, prevailing theories of children's psychological development proposed that a child is a tabula rasa, or blank slate, that is imprinted upon by external forces. These external forces were considered the major formative factors in child behavior patterns.[12]

In the late 1950s, Thomas and Chess began studying behavior patterns in infants by following 141 infants over the course of six years and interviewing their parents regularly. Based on their results, they hypothesized that children are not blank slates; rather, they have internal influences that lead to inherent individual differences in their reactions and motivations. Thomas and Chess defined these innate differences as a child's temperament and described nine temperament factors that influenced psychological development in all participants.[12,13]

Following the landmark Thomas and Chess study, a growing body of research has elucidated the components of temperament and their behavioral implications. In the 1970s, Buss and Plomin distilled the nine factors that Thomas and Chess used to describe temperament to three factors: (1) emotionality (degree of emotional distress); (2) activity (tempo and vigor of a child's energy level); and (3) sociability (the preference for being with others). This three-factor model, known as the EASI theory, showed an improved ability to predict behavior over the nine factors described by Thomas and Chess.[13]

Contemporary research has focused on the biological basis for temperament. This line of research relies on the assumption that variations in temperament are due to differences in how quickly and to what extent the behavioral activation/regulatory systems are activated and/or suppressed.[12] Rothbart and Derryberry redefined temperament as "individual differences in reactivity and self-regulation assumed to have a constitutional basis."[12]

Rothbart et al. developed the Children's Behavior Questionnaire (**CBQ**) to measure the temperamental characteristics of preschool and early school-age children. The CBQ evaluates subjects on 15 different dimensions. (Figure 1). These dimensions cluster into three main factors: (1) extraversion/surgency; (2) negative affectivity; and (3) effortful control. Extraversion/surgency refers to the level of motor and cognitive activity.[12] Negative affectivity is the inclination to experience and express negative emotions. Effortful control is self-control of attention and behavior.[12]

Currently, the CBQ and its counterparts, the CBQ-Short Form (**CBQ-SF**) and CBQ-Very Short Form (**CBQ-VSF**), are the most commonly used temperament assessment tools in

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Correspondence to: Love at [illegible]@gmail.com

The CBQ-SF Impulsivity temperament dimension was significantly associated with the presence of disruptive behavior (p=0.43)

Sedation Options

PEDIATRIC DENTISTRY - V 29 / NO 6 - NOV / DEC 07

Scientific Article

Pharmacologic Behavior Management of Pediatric Dental Patients Diagnosed with Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder

Carolyn A. Kerins, DDS, PhD[a] • Allen G. McWhorter, DDS, MS[b] • N. Sue Seale, DDS, MS[c]

Abstract: ***Purpose:*** *The purpose of this study was to conduct a survey of Texas pediatric dentists to determine: (1) the percentage of patients they treat with attention deficit disorder (ADD)/attention deficit hyperactivity disorder (ADHD); (2) the behavior management techniques that are utilized to treat their patients who suffer from ADD/ADHD; and (3) the relative success rates of these techniques in their practices.* ***Methods:*** *A 17 question, single answer, multiple choice survey was mailed to 343 Texas pediatric dentists. The mailing list was obtained from American Academy of Pediatric Dentistry and Texas Academy of Pediatric Dentistry member rosters. One mailing was sent, including a self-addressed stamped envelope, for returned responses.* ***Results:*** *A 54% response rate (186 surveys) revealed that nitrous oxide was the most frequently used pharmacologic behavior management technique; however, demerol/promethazine/nitrous oxide was rated as effective most often for treating ADD/ADHD patients.* ***Conclusions:*** *Practitioners believe the incidence of attention deficit disorder/attention deficit hyperactivity disorder is increasing, and they are families with the medications used to treat the conditions. Texas pediatric dentists are using a variety of sedation techniques and are interested in developing guidelines for sedation of these patients. (Pediatr Dent 2007;29:507-13) Received July 20, 2006 / Revision Accepted February 6, 2007.*

KEYWORDS: BEHAVIOR MANAGEMENT, ORAL SEDATION, GENERAL ANESTHESIA, ATTENTION DEFICIT DISORDER, ATTENTION DEFICIT HYPERACTIVITY DISORDER

Attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD) are considered to be the most common neurobehavioral disorders among school-age children. They are estimated to affect 3% to 5% of this population.[1] ADD is a diagnosis applied when a patient: (1) persistently fails to give close attention to details; (2) doesn't seem to listen; and (3) is easily distracted by external stimuli. This patient is often referred to as "the daydreamer." ADHD, on the other hand, is a diagnosis applied to a persistent pattern of: (1) hyperactivity; (2) impulsivity; and/or (3) inattention. This person seems to be "always on-the-go." Boys are 3 to 5 times more likely than girls to be affected. While the nature of ADD/ADHD changes as a child reaches adolescence, it is estimated that only 20% of children "outgrow" this disorder.[2] The symptoms of ADD/ADHD are caused by a chemical imbalance in the brain, especially in areas controlling concentration and impulsive behavior.[3]

Most children being treated for ADD/ADHD are managed with a combination of behavioral and pharmacologic therapies. Current drugs employed in the treatment of ADD/ADHD include: (1) prescription stimulants; and (2) nonstimulants. The stimulant category includes: (1) methylphenidate (Ritalin); (2) dextroamphetamine (Dexadrine); (3) pemoline (Cylert); (4) amphetamine salts (Adderall); and (5) sustained release methylphenidate (Concerta). The stimulant medications exert their effect paradoxically by:

1. increasing activity in underactive areas of the brain and normalizing cerebral blood flow and glucose metabolism[4]; or
2. altering the levels of norepinephrine and dopamine.[5]

Recently, nonstimulant medications were introduced to treat ADD/ADHD, including atomoxetine (Strattera) and buproprion (Wellbutrin), which tend to act similarly to antidepressants.

In 1999, the Multimodal Treatment Study of Children with Attention Deficit Hyperactivity Disorder—funded by the National Institute of Mental Health—followed nearly 600 school-age children. It found that stimulant medications were the most effective treatment for ADD/ADHD.[6] Growing concerns from the advisory committee of the Food and Drug Administration, physicians, and parents, however, have re-

Dr. Kerins is assistant professor, Dr. McWhorter is professor, and Dr. Seale is Regents Professor and Chairman, all in the Department of Pediatric Dentistry, Baylor College of Dentistry, Texas A&M University Health Science Center, Dallas, Tex. Correspond with Dr. Kerins at ckerins@bcd.tamhsc.edu

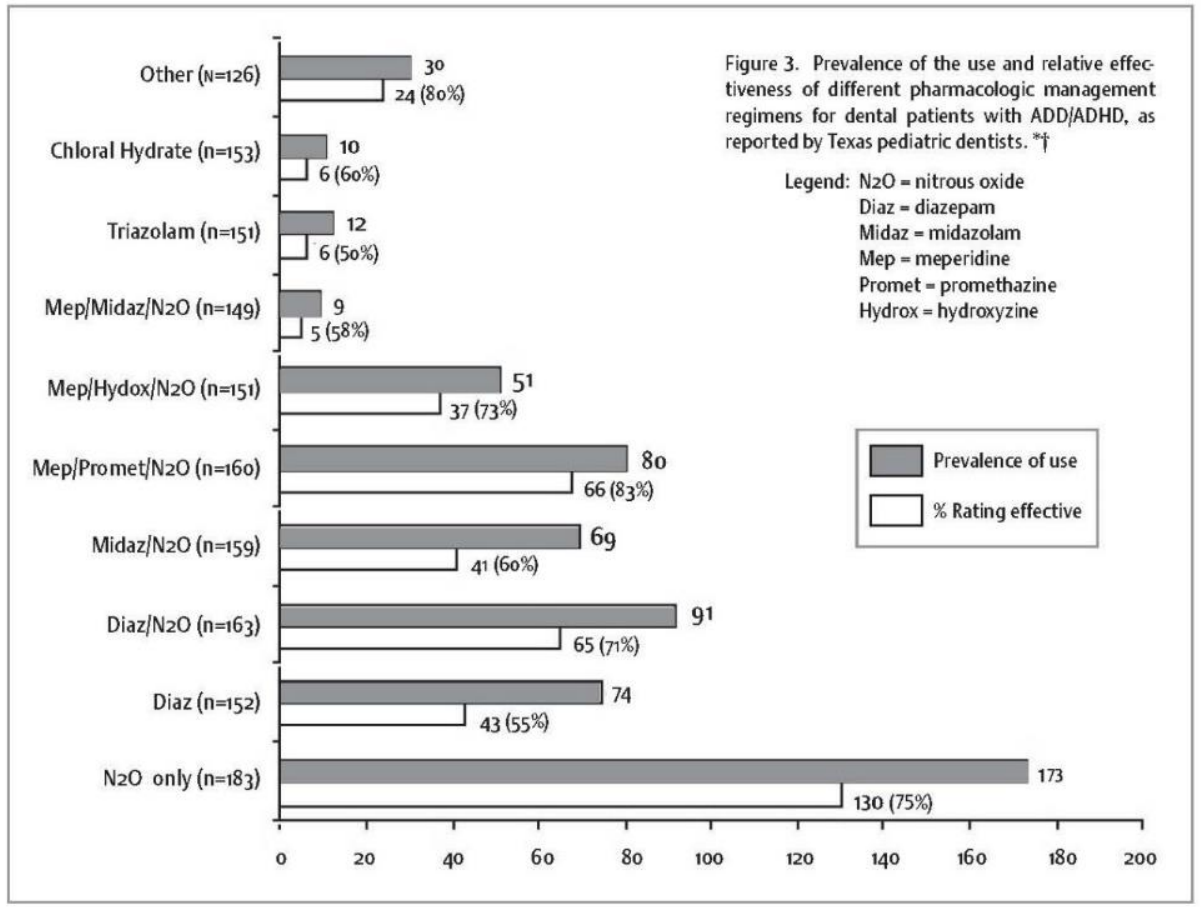


Figure 3. Prevalence of the use and relative effectiveness of different pharmacologic management regimens for dental patients with ADD/ADHD, as reported by Texas pediatric dentists. *†

Legend: N2O = nitrous oxide
Diaz = diazepam
Midaz = midazolam
Mep = meperidine
Promet = promethazine
Hydrox = hydroxyzine

* Prevalence of use is reported as the no. of dentists who responded using a regimen frequently or very frequently.

† % rating effective is displayed as the N and % of those practitioners who reported using a particular regimen as effective or very effective

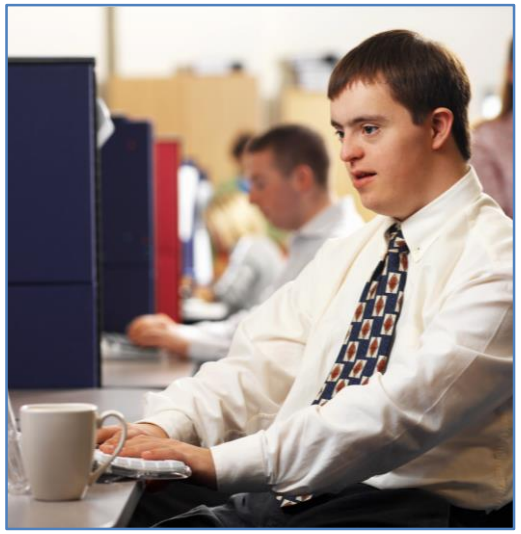
The Most Predictable Option

Transition

Disabilities Increasing

Improvements in medicine

- Increased life expectancy
- More people with intellectual disabilities



Krause et al *Journal of Dental Education* 2010; 74: 1179-1189
Fenton et al *Journal of Dental Education* 2003; 12: 1337-1344

Dental Education & Intellectual Disability

- Many dentists do not feel prepared to care for patients with intellectual disabilities
- Research has shown that the more experience with people with special needs students receive, the more comfortable and more likely they are to care for these patients upon completing school

Krause et al *Journal of Dental Education* 2010; 74: 1179-1189
Fenton et al *Journal of Dental Education* 2003; 12: 1337-1344

Dental Education & Intellectual Disability

Dental school deans

- 53% - graduates were "not competent" to treat
- 50% - not a high priority
- 60% - cited "lack of curriculum time" & "lack of faculty expertise"

Dental students

- 51% say did not receive specialized training
- 68% say did not receive enough classroom instruction
- 75% say they are interested in treating people w/ ID

Special Olympics
Special Smiles®

Transition Challenges

- Only ⅓ of pediatricians report adequate referrals to adult physicians
- Adolescents who do not receive medical transitions less likely to receive dental transition
- Challenging and stressful time period for family
- Lack of dentists comfortable and knowledgeable
- Allocation of pediatric specialty resources
- Lack of reimbursement

AAPD Policy on Transitioning *Pediatric Dentistry* 2016; 38: 117-120
Cruz et al *Pediatric Dentistry* 2015; 37: 442-446
Bayarsaikhan et al al *Pediatric Dentistry* 2015; 37: 447-451
Casamassimo et al *Journal of Dental Education* 2004; 68: 23-28

Transition Strategies

- Better prepare dental students to care for patients with special needs
- GPR and AEGD programs
- Facilitate general dentists getting hospital privileges
- Advocating for dental coverage for adults with special needs
- Support enhanced reimbursement for seeing patients who are medically complex

Special Olympics
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AAPD Policy on Transitioning *Pediatric Dentistry* 2016; 38: 117-120
Cruz et al *Pediatric Dentistry* 2015; 37: 442-446
Bayarsaikhan et al al *Pediatric Dentistry* 2015; 37: 447-451

Transition Best Practices

- Discuss transition and initiate a plan in early adolescence
- Decrease in medical errors during transition with clear direct or indirect communication between pediatric and adult providers
- Coordinate with medical for an overall healthcare transition
- Create a summary of care to facilitate transfer from pediatric to adult care

AAPD Policy on Transitioning *Pediatric Dentistry* 2016; 38: 117-120
Cruz et al *Pediatric Dentistry* 2015; 37: 442-446
Bayarsaikhan et al al *Pediatric Dentistry* 2015; 37: 447-451

Visiting the Dentist is a Life Skill

Case Studies:
Can we just put him out for his exam?

☐ Patient will be 18+ yrs old at the time of surgery
☐ Discussed Guardianship needs with family

updated 07/2014

DENTAL TREATMENT PLANNING WORKSHEET

☐ **SCH Dental Clinic** ☐ **Center for Pediatric Dentistry** ☐ **Odessa Brown Dental Clinic**

Schedule Dental Surgery to: ☐ _____ **(Specify Provider)** ☐ **Any**

Location of Surgery: ☐ SCH Main OR ☐ SCH other venue (OPC or Bellevue Surgery Center)

Est. Proc Time: Dental _____ **+ Combo Proc Time (Endo/Perio/OMFS)** _____ **= Total Time** _____

Combos: ☐ No ☐ Yes If yes, with _____ for _____

PASS Questionnaire Completed: ☐ Yes - see attached ☐ Limited mouth opening intra-molar distance _____mm

H&P: ☐ H&P Obtain thru PASS ☐ H&P Obtain thru PCP

Consent: ☐ Consent Obtained – see attached ☐ Obtain Day of Surgery ☐ Consent Issues? _____

Interpreter Needed: ☐ Yes - Language _____ ☐ No

Admission Status: ☐ Day Surgery ☐ Admit **Type of Bed** ☐ Ward ☐ ICU ☐ ICU **LOS:** _____

Patient Diagnoses/ICD-9 codes: ☐ **Dental Caries 521.00** ☐ **Autism 299.00**

☐ **Other/Medical Diagnosis** _____

Post-operative Visit:
☐ SCH Dental Clinic ☐ UW CPD ☐ OBCC Dental ☐ Other _____

Planning Sheet filled out by _____ on _____
Print Name (Attending / Resident) Date

OR PLANNING and Pre Op Communication

Blood Products: ☐ No ☐ Yes (needs CIS order and not scheduled as first case)
Scheduling Precautions: **Latex** ☐ No ☐ Yes **Diabetic** ☐ No ☐ Yes (implies first case)
Malignant Hyperthermia (MH) ☐ No ☐ Yes (implies first case)

Urgency of Surgery: ☐ Urgent: Reason _____ Weeks ____ Months
☐ Next Available

Films: ☐ Obtain Day of Sx ☐ PACS ☐ CPD/MiPACs ☐ SCH Dental Chart

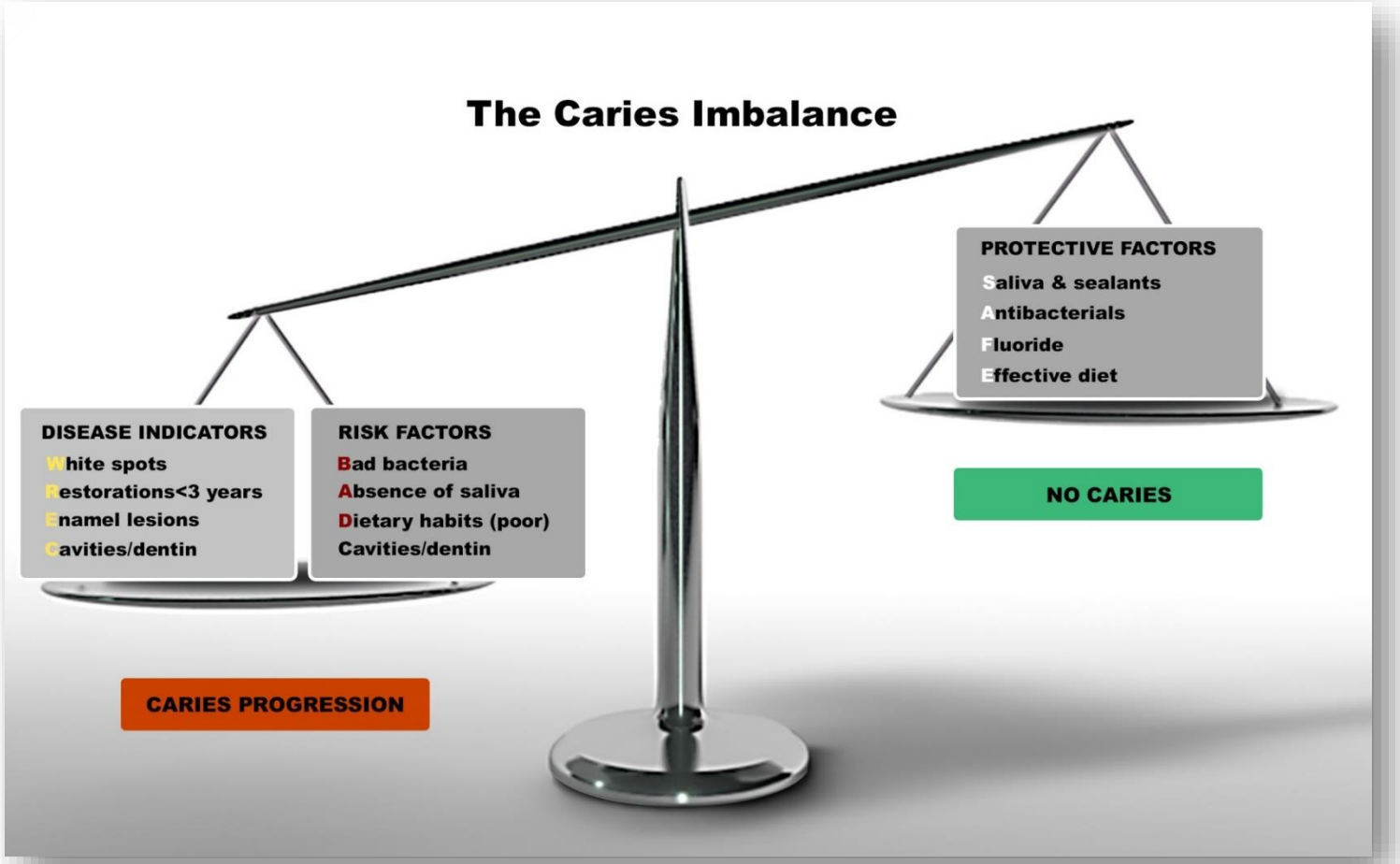
Pre-Operative Consults Required:
VP Shunt ☐ No ☐ Yes date last neurosurgery appt _____ (must be < 1 year from dental surg)
Other consults (specify and place ambulatory order(s) in CIS) _____

Signature _____ Date: _____

SCH Patient Label
Name: _____
DOB: _____

Things to Consider

Caries Risk


The Caries Imbalance
DISEASE INDICATORS
White spots
Restorations<3 years
Enamel lesions
Cavities/dentin
RISK FACTORS
Bad bacteria
Absence of saliva
Dietary habits (poor)
Cavities/dentin
PROTECTIVE FACTORS
Saliva & sealants
Antibacterials
Fluoride
Effective diet
CARIES PROGRESSION
NO CARIES

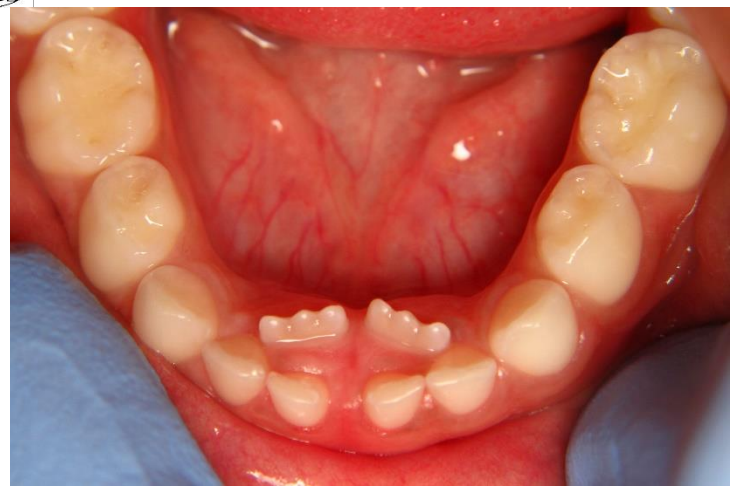
Hygiene

How Bad is the Decay?

Where is it Located?

- Anterior vs posterior
- Occlusal vs interproximal

Orthodontics?



Suspicious “Stain”

What Does The Future Look Like?

What Other Services Can We Provide?

- Full series of radiographs?
- EXT retained primary teeth?
- Place sealants?
- Replace old amalgams?
- 3rd molars?

How Insistent is the parent?

Case 1

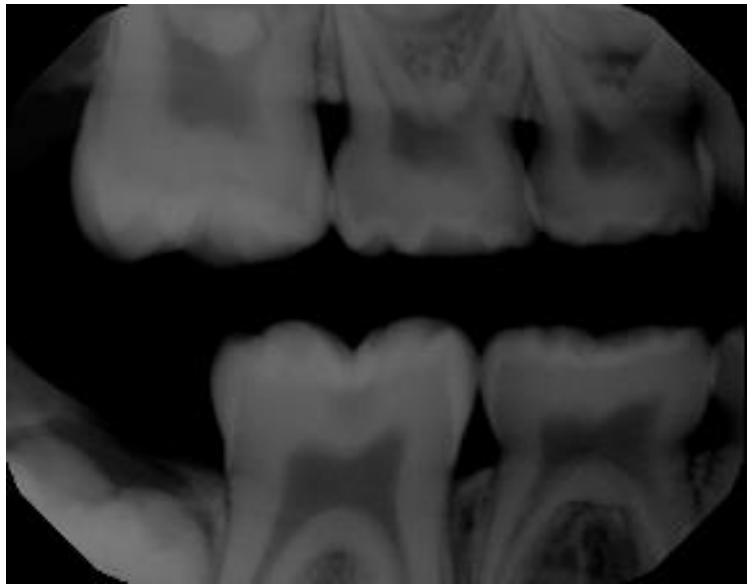
8y1m

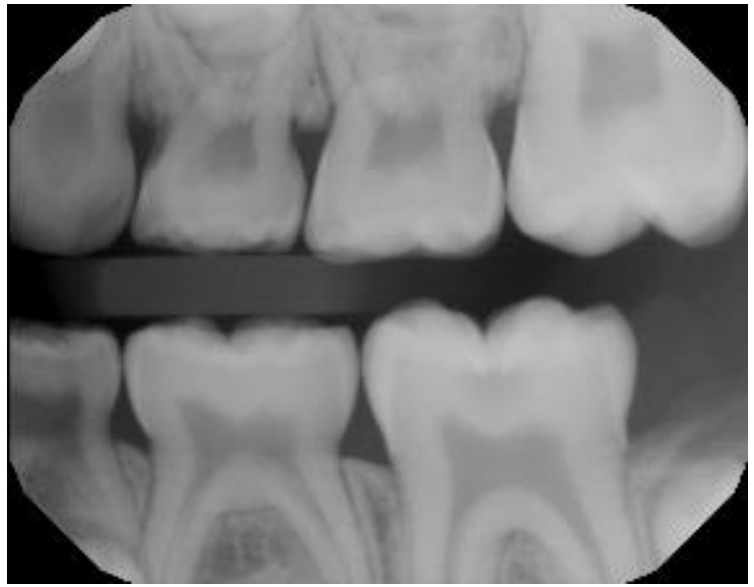
Dx: Asthma, Autism, NKDA

- Exam a little challenging
- Clinical caries appears limited
- History of episodic emergency care

Case 1

Case 1





Case 2

7y11m female

Dx: Autism, ADHD

- Hypoplastic #19, 30
- History of GA at age 4y7m
- History of desensitization with dramatic behavioral improvement

Case 2

Tx Plan

- GA to address:
  - 1st permanent molars
  - #K
  - Ortho suggests EXT #L, M, R, S to allow unraveling of lower incisors and facilitate eruption of lower permanent canines
- Second GA with OS for EXT Lower 4 or 5's and possible serial EXT on Maxilla

Case 3

11 yr old Female

Diagnosis:

1. Prader-Willi syndrome.
2. Autism - diagnosed in September 2009.
3. Hypothalamic dysfunction. Hypothyroid
4. Growth hormone deficiency.
5. Hypotonia.
6. History of laryngotracheomalacia, (resolved)
7. History of gastroesophageal reflux disease. (resolved)
7. History of sleep disordered breathing.
8. Developmental delay.
9. History of comprehensive dental treatment under general anesthesia in February 2009, Janurary 2012.
10. Bipolar Disorder

Case 3

- Treatment under GA at Seattle Children's Hospital at 7yrs old
- Caries now present 1st and 2nd permanent molars
- GA wait time approximately 1 year
- Decalcification maxillary anterior teeth, with likely restoration needed at time of GA

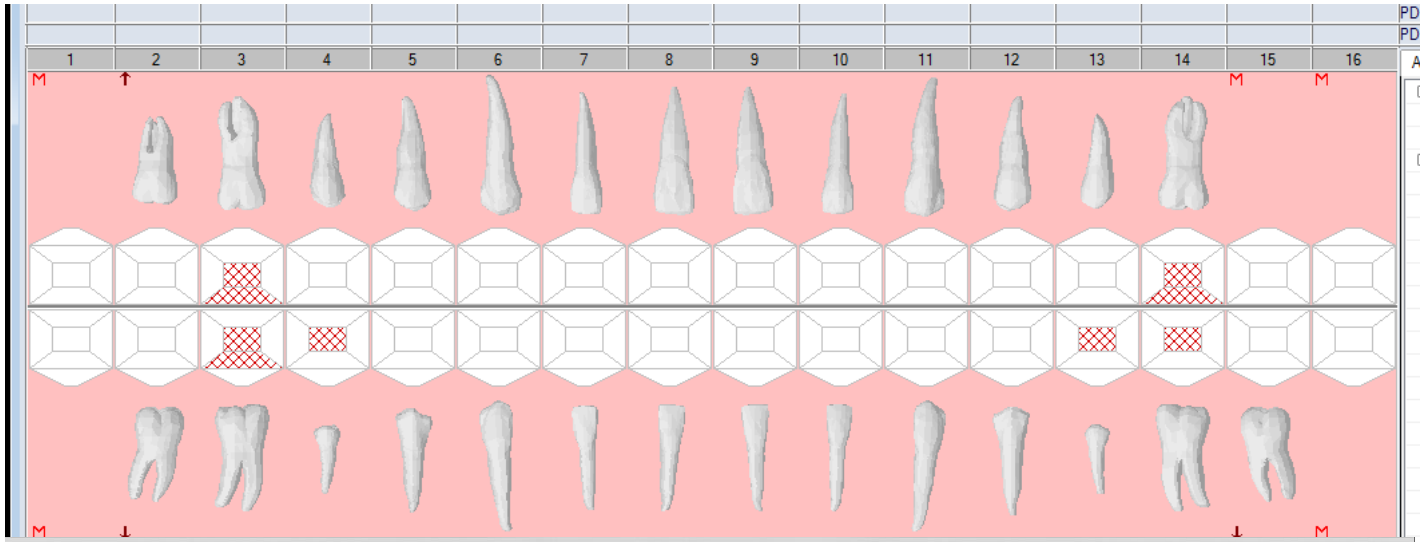
Case 4

10 yr old female

Diagnosis:

Autism

- Caries #3, 14, 19, 30 + #K, T
- Retained primary teeth
- Parent read recent NYT article and interested in SDF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ORTHORALIX

Dental Care for Children with Special Needs

Travis Nelson DDS, MSD, MPH

Hawaii Dental Association Convention

Video Examples

Toothbrushing

Mirror

Recline Chair

Exam

RC Prophy

RC Prophy

Preparing for the Panoramic Film

Taking the Panoramic Film