


How are you gonna get him to do that?!?

The 5Ps of Pediatric Dentistry:
Physiology, Psychology, Pharmacology and Phamily and Phun

DAVID L. ROTHMAN, DDS



1



Affirmation and Disclosures

- ▶ No financial ties to drug or equipment companies to disclose



2

Greetings from San Francisco

3

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4

The average attention span today is 8 seconds


- ▶ Microsoft Corporation/Canadian researchers 2015
 - ▶ Dropped from 12 seconds in 2000
 - ▶ The younger you are the shorter the span
 - ▶ Goldfish have a 9 second attention span



5

The ND Way

- ▶ Ability is what you are capable of doing.
- ▶ Motivation determines what you do.
- ▶ Attitude determines how well you do it.
- ▶ Lou Holtz
 - ▶ Collegiate football coach



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6

Ted Lasso Way

- ▶ **Be Curious, Not Judgmental**
 - ▶ Falsely attributed to Walt Whitman




<https://www.snopes.com/fact-check/be-curious-not-judgmental-walt-whitman/>

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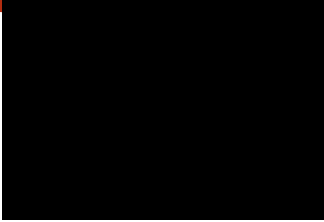
7

How Kids See Us



8


How We See Kids



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9

How We See Parents: just another day



10

A Little Prevention Goes a Long Way


Trying to change parents' and kids' behavior (while keeping your sanity)



11

The Ten Killer Questions

- ▶ "What do you mean that I should have brought my child in between 18 and 24 months?"
- ▶ or: "My pediatrician didn't tell me that."



12

The Answers

- The AAPD recommends the first visit when the first tooth erupts or sooner
- Provide counseling via risk assessment
- Nutrition and diet review
- Safety check
- Note that the pediatrician may see a child 15 times before the child visits the dentist



13

The Answers

- ▶ General Dentists and Pediatricians need to be trained in identifying and diagnosing oral diseases including hard and soft tissue pathoses
- ▶ They are part of the team responsible for the "Dental Home" and fluoride applications
- ▶ See www.AAP.org/oralhealth



Candida



Riga-Fede



14

Caries Risk Assessment

- ▶ History
 - ▶ medical
 - ▶ dental
 - ▶ social
 - ▶ fluoride
- ▶ CAT: caries assessment tool; AAPD
 - ▶ Minimum, moderate, severe



15

Caries Risk Assessment

- Many available
- AAPD www.aapd.org
- CDA CAMBRA www.cda.org
- ISDAS
- Even the pediatricians are claiming this area
 - www.aapd.org/oralhealth/cms
- All provide a systematic approach and a pathway for diagnosis and treatment
 - Decide how complicated you want to be
 - Must be recorded!



16

CDC Report on Oral Health

- ▶ 2019
- ▶ Increase in caries rates in preschoolers
 - ▶ 23% will demonstrate ECC
- ▶ Stabilized rates in elementary and middle schoolers
- ▶ Increased rate in high schoolers



17

Definitions

- ▶ Cavity; a hole in a tooth; may be developmental or bacterial
 - ▶ +/- surface cavitation
- ▶ Caries: a biofilm mediated transmissible, bacterial disease
- ▶ Early Childhood Caries: caries of infants, toddlers, and young children affecting one or more teeth



18

Early Childhood Caries

- ▶ **Early childhood caries (ECC)** is the presence of 1 or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child **71 months of age or younger**.
- ▶ In children **younger than 3 years of age**, any sign of **smooth-surface caries** is indicative of **severe early childhood caries (S-ECC)**.
- ▶ From ages **3 through 5**, 1 or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth, or a decayed, missing, or filled score of >4 (age 3), >5 (age 4), or >6 (age 5) surfaces constitutes **3-ECC**.

19

International Caries Detection and Assessment System (ICDAS)

Figure 1. Caries Diagnosis and Management System Continuum as proposed by the International Caries Detection and Assessment System (ICDAS) Committee.

Primary Prevention at the Patient Level

Caries Risk Assessment at the Patient Level

No Disease ICDAS 0, No Disease ICDAS 1, Initial Lesion ICDAS 2, Moderate Lesion ICDAS 3, Moderate Lesion ICDAS 4, Extensive Lesion ICDAS 5, Extensive Lesion ICDAS 6

Caries Lesion Activity Assessment

Radiograph and Other Diagnostic Aids

Caries Risk Assessment at the Tooth Surface Level

Secondary Prevention, Tertiary Prevention (Cast)

No, Remineralize, Arrest, Sealed, Minimal Surgical, Traditional Surgical, Endodontic Treatment, Extraction

Dimensions of Dental Hygiene, September 2011

20

ADA Caries Classification System

American Dental Association Caries Classification System

ICDAS Code	0	1	2	3	4	5	6
Clinical Description	No visible caries	Enamel demineralization (white spot lesion) without cavitation	Enamel demineralization with cavitation limited to enamel	Enamel demineralization with cavitation extending into dentin	Enamel demineralization with cavitation extending into dentin, reaching the pulp chamber	Enamel demineralization with cavitation extending into dentin, reaching the pulp chamber, and involving the pulp	Enamel demineralization with cavitation extending into dentin, reaching the pulp chamber, and involving the pulp, with a perforation into the pulp space
Radiographic Findings	No radiographic evidence of caries	Enamel demineralization (radiolucent area) without cavitation	Enamel demineralization with cavitation limited to enamel	Enamel demineralization with cavitation extending into dentin	Enamel demineralization with cavitation extending into dentin, reaching the pulp chamber	Enamel demineralization with cavitation extending into dentin, reaching the pulp chamber, and involving the pulp	Enamel demineralization with cavitation extending into dentin, reaching the pulp chamber, and involving the pulp, with a perforation into the pulp space

21

Sugar doesn't cause cavities- acid does!

- ▶ Mutans strep and Lactobacillus make acid
- ▶ 5 fruits to an 8oz. glass of juice
- ▶ Approx. 1 tsp = 5 g sugar
- ▶ 12oz. Soda=39g. of sugar
- ▶ 12oz. JuiceBlast=40g. of sugar
- ▶ Carbonic acid/Phosphoric acid/Citric acid
- ▶ The two hour rule

22

Biofilms!

- ▶ 80% of infectious diseases are biofilm (polysaccharide-bacteria) mediated
- ▶ Multiple organisms interacting
 - ▶ Can be benign individually; together wreak havoc
 - ▶ P. gingivale
- ▶ Traditional treatment
 - ▶ Antibiotics
 - ▶ Mechanically debride
 - ▶ Opens up avenues to other potentially pathogenic strains
- ▶ New treatment
 - ▶ Change environment and ecology
 - ▶ Unfermentable sweeteners
 - ▶ Prevent adhesion of bacteria
 - ▶ Xylitol
 - ▶ Honey from heath pollen (Manuka honey)
 - ▶ Change pH
 - ▶ Arginine toothp.

23

Erosion v Decay

- **Erosion**
- **Deminerilization or dissolution** of the carbonated hydroxyapatite crystal of enamel/dentin of the tooth in an **acidic environment** reversed by a neutral or basic oral environment in which minerals redeposit on the tooth surface.
- **Caries**
- A **bacterial mediated deminerilization** of the enamel/dentin in which a sugar substrate is metabolized by various bacteria. Their metabolic waste product deminerilizes the tooth in a **localized area** protected by plaque. Reminerilization occurs at a rate slower than deminerilization and the bacteria move into the cavitation that develops.

24

Attrition, Abrasion and Erosion


- ▶ **Attrition:** physiologic wear from mastication
 - ▶ Normal!
- ▶ **Abrasion:** pathologic wear of teeth from mechanical rubbing
 - ▶ Bruxing, toothbrush and toothpaste wear
 - ▶ Brush lightly not hard- bristles don't move!
- ▶ **Erosion:** pathologic wear from chemical dissolution
 - ▶ Acidic foods/drinks, GERD

Table: Erosion and denture erosion scale. Each exposed tooth surface (buccal, lingual, occlusal, or incisal) is scored.*	
Grade 0	No erosion
Grade 1	Erosion only enamel only; no exposure of dentin
Grade 2	Less than one-third of surface has dentin exposed
Grade 3	One-third or more of surface has dentin exposed

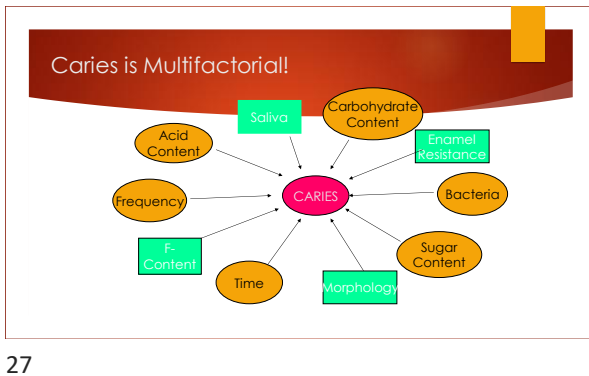
25

Saliva: the wonder drug


- ▶ Neutralizes acid with phosphate buffer returning oral cavity to basic environment
 - ▶ Stops demineralization
 - ▶ Promotes remineralization
- ▶ Contains Ca^{++} , PO_4^- , OH^- and F^- (exogenous)
 - ▶ Remineralizes early decalcification in a basic environment
- ▶ Antibiotic/antiviral
 - ▶ Enzyme system that breaks down food especially carbs to simple sugars!
- ▶ Washes away food substances
- ▶ The more the better!!!!



26



Treatment Modalities



- Habit/Diet/Frequency of eating
- Decrease fermentable carbohydrate and sugar content
- Remove/disrupt biofilm
- Alternative Medicine Therapies- not tested/approved
 - Ozone
 - Oil Pulling (coconut oil)
- Chemotherapy
- Xylitol topical application
 - Gums/candy/wipes
- Topical fluoride use
 - Gelapap/Varnish
- Chlorhexidine use does not decrease incidence of coronal caries
- Silver diamine fluoride
- Interim restorative (ART)/palliative
 - Glass ionomers (fluoride releasing)
- Liquefice pops
- Definitive treatment

28

Oh No!!!



- ▶ Proceedings of the Symposium on Innovations in the Prevention and Management of Early Childhood Caries
 - ▶ Oct. 23-24, 2015 Elkville, Md
- ▶ Evidence of Effectiveness of Current Therapies to Prevent and Treat Early Childhood Caries; S. Twetman, V. Dhar
 - ▶ 877 reports, 33 met criteria
 - ▶ Fluoride toothpaste and varnish: **limited evidence**
 - ▶ Fluoride tablets and drops: **insufficient evidence**
 - ▶ Silver Diamine Fluoride, Xylitol, Chlorhexidine varnish/gel, Povidone Iodine, Probiotic Bacteria, Remineralizing agents (ACP-CP): **insufficient evidence**
 - ▶ Sealants, restorations, regular restorations: **insufficient evidence**
- ▶ **THERE IS NO EVIDENCE THAT ANYTHING WE DO WORKS!!!**

29

Defining the Pediatric Patient: What is a Child?



30

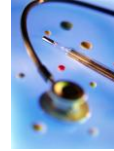
Health Statistics for Children

- ▶ Percent of school-aged children 5-11 years of age who are in excellent or very good health: 82%
- ▶ Percent of school-aged children 5-11 years of age who missed 11 or more days of school in the past 12 months because of illness or injury: 5.1%
- ▶ Percent of children 6-11 years of age who are overweight: 17% (2003-2006)
- ▶ Percent of children under 18 years of age without health insurance: 8.9% (2008)
- ▶ Percent of children under 18 years of age without a usual source of health care: 5.2%
- ▶ Source: CDC

31

Diseases of Childhood

- ▶ Unbracketed tooth decay
 - ▶ Between 20 and 30%
- ▶ Learning Difficulties/ADHD
 - ▶ Between 8.5 and 10%
- ▶ Allergies
 - ▶ Hay fever 11.4%
 - ▶ Asthma 4.1%
 - ▶ Skin 4-6%
- ▶ Asthma
 - ▶ 10.3 to 10%
- ▶ Obesity
 - ▶ 17%
 - ▶ Overweight/obese/greenly obese 30%
- ▶ Activity limitation due to one or more chronic health problems
 - ▶ 8.10%
- ▶ Depression
 - ▶ 8.12%
- ▶ Autism
 - ▶ 1 out of 45 live births



32

U.S. Population

- ▶ Total US Population: 309,160,890
 - ▶ 1 birth q8 sec
 - ▶ 1 death q12 sec
- ▶ US Children: 73,000,000
 - ▶ ~25% of population
- ▶ US Senior citizens: 39,000,000
 - ▶ ~13% of population
- ▶ Source: CIA



33

U.S. Birthrate

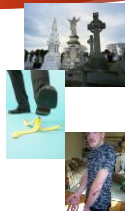
- ▶ 2009
 - ▶ 13.2 per 1000 population (CIA World Factbook)
 - ▶ 13.4 per 1000 population (UN)
- ▶ 2002
 - ▶ 13.9/1000
- ▶ 2001
 - ▶ 14.1/1000
- ▶ 1990
 - ▶ 16.7/1000
- ▶ Teen rates dropped to approx <40/1000 girls
 - ▶ 2010 lowest on record
- ▶ Low birth weight babies increased to 7.9%
 - ▶ Preterm babies <37 weeks increased to 12%



34

Mortality

- ▶ 1-4 years of age
 - ▶ Number of deaths: 4,631
 - ▶ Deaths per 100,000 population: 28.4
 - ▶ Leading causes of death
 - ▶ Accidents (parental injuries)
 - ▶ Congenital malformations
- ▶ 5-14 years of age
 - ▶ Number of deaths: 6,149
 - ▶ Deaths per 100,000 population: 15.2
 - ▶ Leading causes of death
 - ▶ Accidents (parental injuries)
 - ▶ Cancer



35

Life Expectancy 2020

- ▶ Life expectancy of adult 10 years ago: 78 years
- ▶ Life expectancy of adult today: 76 years (2020)
 - ▶ Life expectancy of child today: 72-73 years (2020)
 - ▶ Obesity + diabetes + heart disease + stroke + amputations + blindness
 - ▶ Life expectancy of child with cerebral palsy
 - ▶ ~degree of disability
 - ▶ Approximately 85-95% alive at 20 years
- ▶ This is the first generation of children who will have a shorter life expectancy than their parents
- ▶ Covid has decreased life expectancy



36

Covid-19 and Children

- ▶ 4% will show long term effects "long termers"
 - ▶ Fatigue
 - ▶ Fog
 - ▶ Respiratory issues
- ▶ Covid mouth
 - ▶ Exfoliative lesions on attached mucosa
 - ▶ Maskne
- ▶ Multisystem Immunodeficiency Syndrome-Covid
 - ▶ Autoimmune rapid progressive disease



37

And All Is Peaceful in the Land of Oz



38

Parenting, Psychology and the Phamily



39

I Yam What I Yam...

- ▶ **Scientific classification**
- ▶ Kingdom: *Animalia*
- ▶ Phylum: *Chordata*
- ▶ Class: *Mammalia*
- ▶ Order: *Primates*
- ▶ Family: *Hominidae*
- ▶ Subfamily: *Homininae*
- ▶ Tribe: *Hominini*
- ▶ Genus: *Homo*
- ▶ Species: *H. sapiens*



Shaun White et mol

40

Defining the Pediatric Patient

- ▶ Growth Charts
 - ▶ Function of height, weight, BMI and age
 - ▶ Recent changes because of development and obesity
 - ▶ Specific for secular populations



41

Easy Definitions

- **Premie** (preterm): born before 40 weeks after gestation (<37 weeks)
- **Neonate** (newborn): first 28 days after birth
- **Infant**: between 1 month and 1 year (alternative 3 years)
- **Childhood**: includes toddlerhood and preadolescence
 - Toddlerhood: between 1 and 3 years
 - Childhood: between 3 and 10 years
- **Adolescence**: begins at puberty
 - Ends at maturity between 17-19
 - Never ends in males!



42

So, What is a Child?

- ▶ Sedation and Anesthesia Guidelines
 - ▶ AAFP/ASA/AAP
 - ▶ Under 21 years of age
 - ▶ ADA
 - ▶ 12 and under
- ▶ Nelson's Pediatrics
 - ▶ Infants, children and adolescents
- ▶ Pediatric Endocrinology
 - ▶ Patients up to maturity or less than 18
- ▶ Anesthesiology
 - ▶ Physiologically, the 3 year old is more like an adult than an infant
 - ▶ Always anatomy
 - ▶ Pharmacokinetics
 - ▶ Organ function and formation
- ▶ **It's all about who is defining it...**

43

Defining the Pediatric Patient



- ▶ Puberty
 - the condition of being or the period of becoming first capable of reproducing sexually, marked by maturing of the genital organs, development of secondary sex characteristics, and in the human and in higher primates by the first occurrence of menstruation in the female (Merriam-Webster 2010)
 - Females < males
 - Now 1.5-2 years earlier than in 1980- Danish (2009) and American (2005) studies
 - Possibly related to nutrition, exposure through plastics to hormone like substances, exposure through food to Bovine Growth Hormone (BGH) and other animal growth stimulants
- ▶ Ethnic differences
 - 14% of 7 yo African American females show the beginning signs of 2nd sexual characteristics
- ▶ Weight
 - Obese females (>90 BMI) reach puberty younger
 - Obese males (>90BMI) reach puberty later

44

Defining the Pediatric Patient

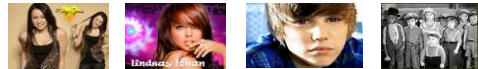
- ▶ Chronological Age
 - ▶ Time counted from birth
- ▶ Physiological age
 - A person's age as estimated by his or her body's health and probably life expectancy.
 - A person's age estimated in terms of function.
 - the age of an individual expressed in terms of the chronological age of a normal individual showing the same degree of anatomical and physiological development. (about.com)
- ▶ Mental age
 - ▶ An intelligence test score (I.Q.), expressed as the chronological age for which a given level of performance is average or typical.
- ▶ Developmental age
 - ▶ Pioneered by Freud and Erikson
 - ▶ Developmental milestones are a set of functional skills
 - ▶ Gross motor
 - ▶ Fine motor
 - ▶ Language
 - ▶ Cognitive
 - ▶ Social



45

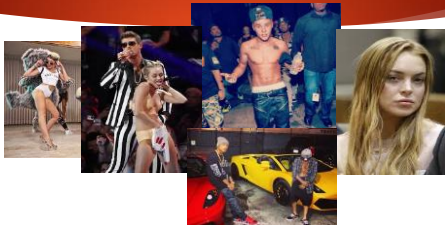
Defining the Pediatric Patient

- ▶ Minor
 - ▶ The legal definition of "child" generally refers to a minor, otherwise known as a person younger than the age of majority
 - ▶ (DBC: Oral Conscious Sedation Permit for Minors: 13 and under)



46

Post Minor!



47

Defining the Pediatric Patient

- ▶ Age of Majority
 - ▶ the threshold of adulthood as it is conceptualized (and recognized or declared) in law.
 - ▶ the chronological moment when a minor ceases to legally be considered a child and assumes control over their persons, actions and decisions
 - ▶ terminates the legal control and legal responsibilities of their parents or guardian over and for them.
 - ▶ Every country is different and ranges from less than 14 to greater than 18 years
 - In US all states except AL (19), DE (19), MS (21) and NE(19) and a few that depend on H.S. graduation age recognize 18 as the age of majority

48

Defining the Pediatric Patient

▶ Age of Majority + 3

- ▶ Lawsuits may be filed at age of majority plus three years for discovery (depending on the legal issue) for damages which occurred as a child when below the age of majority.



49

Defining the Pediatric Patient

▶ Emancipation

- A child who is legally emancipated by a court of competent jurisdiction automatically attains his or her maturity (majority) upon the signing of the court order.
- ▶ Distinct from the legal process by which a child might be taken into foster care and/or made a ward of the court
 - ▶ Foster care and court wardship do not confer maturity upon the child so separate her parents (or guardians).



50

Defining the Pediatric Patient

▶ Age of Consent (AKA Sexual Age)

- ▶ minimum age at which a person is considered to be legally competent of consenting to sexual acts
- ▶ The European Union calls it the **legal age for sexual activities**
- ▶ Should not be confused with the age of majority, age of criminal responsibility, the marriageable age, the age at which one can purchase and consume alcoholic beverages, or drive a car (see age of license)



51

Defining the Pediatric Patient

▶ Age of License

- The age of license is an age at which one has legal permission from government to do something. (You can fight in a war and kill but you can't drink)
- States' rights
 - Determined by agrarian v. industrial
 - ▶ Voting age
 - ▶ Drinking age
 - ▶ Driving age
 - ▶ Working age



52

Defining the Pediatric Patient

▶ Age of Assent

- ▶ Generally regarded as 7 to 17 years of age
 - ▶ controversial in nature
 - ▶ Providing enough **age** appropriate information to allow a child to assent or have dissent overridden in a case where there is a situation where harm may occur by postponing
 - ▶ The term used when a child agrees to be in a study.



53

Defining the Pediatric Patient

▣ Age of Responsibility

- ▣ A child is considered mentally able to make reasonable and rational decisions about his/her actions and take responsibility for them.
- ▣ In Roman times, children were regarded as not culpable for crimes, a position later adopted by the Church. In the nineteenth century, children younger than seven years old were believed incapable of crime. Children from the age of seven were considered responsible for their actions. Therefore, they could face criminal charges, be sent to adult prison, and be punished like adults by whipping, branding or hanging.



54

Defining the Generations

- ▶ Lost Generation
 - ▶ Fought in WWI
- ▶ Greatest Generation (GI Generation)
 - ▶ Veterans who fought in WWII
- ▶ Silent Generation
 - ▶ Born between 1925 and 1945
 - ▶ Too young to fight in WWII
 - ▶ "Children of the Great Depression"
- ▶ Baby/Boom Generation
 - ▶ 1946-1964
 - ▶ Born after WWII marked by increase in birth rates
 - ▶ Remodeled society, rejected or redefined social and traditional values
 - ▶ Returned to the values later in life
 - ▶ Rock and Soul



55

Defining the Generations

- ▶ Generation X
 - ▶ 1964-1982
 - ▶ MTV Generation
 - ▶ Baby Buster or Boom Shadow
 - ▶ Decrease in birth rates
 - ▶ Intro of home computers, video games, cable television, the internet and the DotCom Bubble
 - ▶ AIDS epidemic
 - ▶ Iraq War
 - ▶ Highest education levels of any generation
 - ▶ Lower overall income- men 12% less than fathers
 - ▶ Grunge and hip hop



56

Defining the Generations

- ▶ Xennials
 - ▶ 1977-1983
 - ▶ Analog Childhood
 - ▶ Digital Adulthood



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57

Defining the Generations

- ▶ Generation Y: The Millennials
 - ▶ ~1982-1993 (up to 2000)
 - ▶ Echo Boomers
 - ▶ Children of Baby Boomers
 - ▶ Significantly increased birth rate but still not as great as Baby Boomers
 - ▶ Generation Me
 - ▶ Narcissistic (military enrollments decreased during war)
 - ▶ Entitlement and rejection of social conventions
 - ▶ Dr. Fred Bonner: "white, affluent teenagers who accomplish great things as they grow up in the suburbs, who confront anxiety when applying to super-selective colleges, and who multitask with ease as their helicopter parents hover reassuringly above them."
 - ▶ Trophy Kids
 - ▶ They get a trophy for everything they do



58

Defining the Generations

- ▶ Generation Y: The Millennials
 - ▶ Boomerang Generation/Peter Pan Generation
 - ▶ Delay rites of passage into adulthood and move home after college
 - ▶ Economic prospects falter
 - ▶ College completion rates decrease especially boys
 - ▶ Frequently switching jobs without loyalty or concern for future
 - ▶ No brand loyalty
 - ▶ Facebook, MySpace, Twitter: media driven
 - ▶ Electropop and hip hop / indie Rock



59

Defining the Generations


- ▶ Generation Z
 - ▶ Mid 1990s – 2010
 - ▶ Generation M (multitasking)
 - ▶ Net Generation
 - ▶ Internet Generation
 - ▶ Lifelong use of world wide web and internet
 - ▶ Mobile phones as a rite of passage
 - ▶ Instant messaging and social media
 - ▶ MP3 players (target tapes, CDs, DVDs, records)
 - ▶ Inability to concentrate/focus
 - ▶ Overscheduled and underdisciplined



60

Defining the Generations

- ▶ Generation Z
 - ▶ National Center for Education Statistics
 - ▶ 17 million enrolled in undergrad higher education
 - ▶ 1 in 5 at least 30 yo.
 - ▶ 1% financially independent
 - ▶ 1 in 4 caring for a child
 - ▶ 47% part time
 - ▶ 1% take gap year before college
 - ▶ 2/5 attend community college
 - ▶ 46% have parents, who don't have a bachelor's degree
 - ▶ Summary: we have to change how we look at this generation
 - ▶ Redefine traditional v nontraditional student



by Matthew A. White / iStockphoto.com

61

Defining the Generations

- ▶ Generation Aught
 - ▶ 2000-present
 - ▶ Double zeros?
 - ▶ Zeros?
 - ▶ Zips?
 - ▶ Nadas?
 - ▶ Naughties?



62

Defining the Generations

- ▶ Generation Alpha
 - ▶ 2012 to present
 - ▶ Affected by pandemic
 - ▶ Poor behavior/poor parenting
 - ▶ Concentration and focus
 - ▶ Eye glasses!



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63

CoVid 19

- ▶ Corona Virus 2019
- ▶ Increased family stress
- ▶ Increase tooth decay
- ▶ Increased breakdown of norms
- ▶ Decreased daily structure
- ▶ Long-term effects on children and education unknown



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64

Defining the Pediatric Patient



- ▶ Developmental stages
 - ▶ Physiological
 - ▶ Determined by growth characteristics
 - ▶ Developmental
 - ▶ Milestones in learning
 - ▶ Interpersonal skills
 - ▶ Fine motor and gross motor skills
 - ▶ Development of self



65

Defining the Pediatric Patient

- ▶ Developmental Stages
 - ▶ Early Childhood (Birth to 8)
 - ▶ Physiologic:
 - ▶ Between birth and 3
 - ▶ Doubles in height
 - ▶ Quadruples in weight
 - ▶ Rate of growth slows between 5 and 8
 - ▶ Developmental
 - ▶ Peer relationships
 - ▶ Birth to 2: parallel play
 - ▶ 3 to 8: friendships develop
 - ▶ Gender identity
 - ▶ Sense of right and wrong
 - ▶ "The Plastic Brain"
 - ▶ Malleable and reformative brain

66

Developmental Milestones

▶ 12-Month Old Developmental Milestones

- ▶ Vocalize/gestures or speaks words to communicate
- ▶ Crawls, cruises, or walks
- ▶ Responsive, affectionate or aggressive towards others
- ▶ Finger feeds, uses cup and spoon independently
- ▶ Has precise pincer grasp
- ▶ Imitates, shakes, bangs and throws objects
- ▶ Waves bye-bye
- ▶ Tests permanence (and your nerves)



67

Developmental Milestones

▶ 24-Month Old Developmental Milestones

- ▶ Has vocabulary of at least 20 words
- ▶ Uses two-word phrases
- ▶ Can go up and down steps one step at a time
- ▶ Can kick a ball
- ▶ Stacks 5-6 blocks
- ▶ Imitates adults
- ▶ Can follow 2 step commands



68

Developmental Milestones

▶ 3-4 Year Old Developmental Milestones

- ▶ Goes up and down stairs without support
- ▶ Kicks ball / jumps in place
- ▶ Rides tricycle
- ▶ Has self-care skills
- ▶ Knows name, age, and gender
- ▶ Shows early imaginative behavior

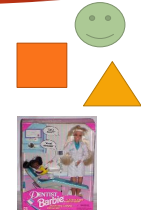


69

Developmental Milestones

▶ 5 Year Old Developmental Milestones

- ▶ Dresses self without help
- ▶ Draws person with head/body/arms/legs
- ▶ Recognizes letters of alphabet
- ▶ Copies triangle/square
- ▶ Plays make believe and dress up
- ▶ Plays interactive games with peers
- ▶ Follows rules of games



70

Defining the Pediatric Patient

▶ Developmental Stages

▶ Middle Childhood (8 to 12 years)

- ▶ Physiologic
 - ▶ Latency period
 - ▶ Growth slow and steady until puberty
- ▶ Developmental
 - ▶ Rule based learning



71

Defining the Pediatric Patient

▶ Developmental Stages

▶ Adolescence (12-18 yrs approx.)

- ▶ Culturality
 - ▶ Identity Formation
 - ▶ Begins with Sexual Maturity; Ends with established identity in community
 - ▶ Social Context is culturally based
 - ▶ Adolescence may not exist or may be short
 - ▶ Onset is puberty = adulthood
 - ▶ US may extend into 20s



72

Defining the Pediatric Patient

- ▶ Developmental Stages
 - ▶ **Adolescence** (12-18 yo approx.)
 - ▶ Physiologically
 - ▶ 2 years rapid followed by 3 years slow and steady
 - ▶ Unpredictable
 - ▶ Sexual development



73

Defining the Pediatric Patient


- ▶ Developmental Stages
 - ▶ **Adolescence** (12-18 yo approx.)
 - ▶ Cognitive
 - ▶ Early
 - ▶ Classify and order objects
 - ▶ Reverse process
 - ▶ Logic
 - ▶ Late
 - ▶ Abstract reasoning
 - ▶ Hypothesis testing



74

“ It is human to have a long childhood; it is civilized to have an even longer childhood. Long childhood makes a technical and mental virtuoso out of man, but it also leaves a life-long residue of emotional immaturity in him. ”


— Erik Homburger Erikson (1902-1994)



75

Children with Disabilities, Complex Medical Histories and Those at High Risk for Complications


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76

Before we begin


- ▶ Do No Harm to the Patient, the Staff Members and You
 - ▶ Assess all risks
 - ▶ Sedation
 - ▶ Physicality
 - ▶ Cognition
 - ▶ Cooperation



77

Diseases of Childhood (5-17)

- ▶ Untreated tooth decay
 - ▶ Between 20 and 30%
- ▶ Learning Difficulties/ADHD
 - ▶ Between 8.3 and 13%
- ▶ Allergies
 - ▶ Hay fever 11.4%
 - ▶ Food 4.1%
 - ▶ Skin 9.4%
- ▶ Asthma
 - ▶ 15%
- ▶ Obesity/Gross Obesity/Overweight
 - ▶ ~35-40%
- ▶ Activity limitation - due to one or more chronic health problems
 - ▶ 8%
- ▶ Anxiety and Depression
 - ▶ > 10%



78

Statistics

1 out of 9 children under age 18 receive special education service



7 out of 10 Americans are either directly impacted by a disability or have a family member, friend or associate who has a disability



President's Committee on
Employment of People with Disabilities

79

Statistics (noninstitutionalized children)

- ▶ 18.4% of U.S. children and adolescents, ages 18 and under (12.6 million) have special health care needs
- ▶ These children comprise almost 19% of all children, but they account for 44.9% of all children's total expenditures for health care




U.S. Dept. of Health and Human Services
HRSA/MCHB

80

Sleep Behavior

- ▶ Does the child snore?
- ▶ Is sleep peaceful or restless?
- ▶ Bedwetting?
- ▶ Sleep apnea?
- ▶ Frequently awakens?
- ▶ Nightmares?



■ Positive answers to two or more questions indicates increased risk for airway obstruction during sleep, treatment and sedation!

■ International Classification of Sleep Disorders (ICSD) 2nd ed^o Chicago, IL: American Academy of Sleep Medicine; 2005

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81

Obstructive Sleep Apnea - Resources


- ▶ ACP Clinical Practice Guideline
 - ▶ Diagnosis and management of obstructive sleep apnea syndrome; **PEDIATRICS** 2012
- ▶ Chan J, Edman J, Koltai P: Obstructive sleep apnea in children. **Am. Fam. Physician** 2004;69:1147-54
- ▶ American Academy of Otolaryngology
 - ▶ Pediatric Obstructive Sleep Apnea
 - ▶ www.wntnet.org/kids/ENT/
- ▶ ClevelandClinicMed.com
 - ▶ Sleep disordered breathing

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Stages of Sleep

- ▶ Awake
- ▶ Light Sleep
 - ▶ NREM Stage 1 (AKA Stage 1)
 - ▶ 1-10 min/hypnic jitters
 - ▶ NREM Stage 2 (AKA Stage 2)
 - ▶ 10-30 min/ slowing heart rate/decrease temp/decrease bp
- ▶ Deep Sleep
 - ▶ NREM Stage 3 (AKA Stage 3 and Stage 4) (slow wave sleep/delta wave sleep)
 - ▶ 30-45 min/ disorientation/sleeps through disturbances
- ▶ REM Stage 4 (AKA REM Sleep)
 - ▶ Occurs at 90 min for approx. 10 min
 - ▶ Sleepwalking and dreaming
 - ▶ Bedwetting if ADH not made
 - ▶ Increased length as night goes on
 - ▶ Active brain waves




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83

Sleep Disordered Breathing

- ▶ Spectrum Disorder of sleep-related breathing disorders
 - ▶ Snoring
 - ▶ Upper Airway Resistance Syndrome (UARS)
 - ▶ Obstructive Sleep Apnea-Hypopnea Syndrome (OSAS/HS)
- ▶ No longer considered benign or social nuisance
 - ▶ By Svs ID
 - ▶ By loss of IQ points
- ▶ Increase work of breathing with fatigue/inattention/hyperactivity
- ▶ Disordered REM sleep with frequent repositioning to open airway
- ▶ Predisposing factors include
 - ▶ Obesity
 - ▶ Retrognathia
 - ▶ Body posture
 - ▶ Use of alcohol or sleep sedatives
 - ▶ Nasal blockage



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Seasons Affect Sleep Apnea

- Colder weather increases number of apneic episodes per hour
- More severe cases occur during the colder months
- Other contributors:
 - High atmospheric pressure and humidity
 - High levels of air pollution
 - Airway irritants from smoke
- Casati, CM, Martini, D. et al. Is sleep apnea a winter disease? Meteorological and sleep laboratory evidence collected over one decade. *Chest Online*, 06/04/2012
- AAP 2012: Guidelines for the Clinical Management of Sleep Apnea

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Sleep Disordered Breathing

- Snoring**
 - Multiple assessments necessary
 - History of noisy or disrupted sleep
 - No drop in oxygen saturation
- Epworth Sleepiness Scale- situation related
 - 0 = Would never doze
 - 1 = Slight chance of dozing
 - 2 = Moderate chance of dozing
 - 3 = High chance of dozing

Situation	Chance of dozing (0-3)
Sitting and reading	0 1 2 3
Sitting in a car	0 1 2 3
Sitting in a public place—for example, a theater or meeting	0 1 2 3
As a passenger in a car for an hour without a driver	0 1 2 3
While lunching or in a meeting	0 1 2 3
Sitting and watching television	0 1 2 3
Sitting quietly after lunch without your usual activity	0 1 2 3
Sitting in a car, without stopped in traffic	0 1 2 3

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Sleep Disordered Breathing

- Upper Airway Resistance Syndrome**
 - Crescendo snoring
 - Repeated arousals lead to excessive daytime sleepiness and fatigue
 - Arousal leads to airway opening and decrease in upper airway resistance
 - Usually one to three breaths in duration
 - No evidence of oxygen desaturation
 - Final dx may be made by polysomnography



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Sleep Disordered Breathing

- Obstructive Sleep Apnea-Hypopnea Syndrome**
 - Partial or complete episodes of airway obstruction
 - Repetitive collapse of the pharynx
 - Reduction of airflow leads to hypopnea or complete closure apnea
 - Hypopnea- reduction in airflow and baseline ventilation reduced by 50% for 10 seconds
 - Apnea-cessation of airflow with continued respiratory effort for 10 seconds
 - Central apnea has no respiratory effort
 - Patient must demonstrate 5 obstructed breathing events per hour during polysomnography

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89


Sleep Disordered Breathing

- Obstructive Sleep Apnea-Hypopnea Syndrome**
 - RDI (respiratory disturbance index) = number of sleep apneas + hypopneas/hour of sleep
 - >15/hour indicates possible OSAHS
 - Epworth Scale between 12 and 24
 - Physical Findings
 - Enlarged tonsils
 - Nasal obstruction
 - Retrognathia
 - Macroglossia
 - GERD
 - Anemia
 - (In adults hypertension and cor pulmonale)
 - Social Findings
 - Lack of alertness and focus
 - Fatigue
 - Nocturia

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Obesity as an Underlying Cause of Sleep Disorders



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Obesity and Sedation

- ▶ Multi-system problem
- ▶ Significant health and sedation risk factor
- ▶ Changes metabolism of lipid soluble drugs
 - ▶ Delayed onset
 - ▶ Delayed emergence
- ▶ Difficult positioning to keep airway open
 - ▶ Neck roll
 - ▶ Chair tilt

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BMI Classification

- ▶ Make a weight diagnosis using BMI percentile
 - ▶ < 5%ile Underweight
 - ▶ 5-84%ile Healthy Weight
 - ▶ 85-94%ile Overweight
 - ▶ 95-98%ile Obesity
 - ▶ >=99%ile Gross Obesity

}

■ **For Patient Communication...**

- Weight or Excess Weight
- Body Mass Index (BMI)
- Risk for Diabetes & Heart Disease

▶ >30-60% of children are OW,OB or Grossly OB

■ Pediatrics 2009; 124: Supplement on Issues and Implications of Screening, Surveillance & Reporting of Children's BMI

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93

Medical Assessment

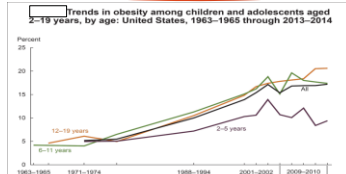
- ▶ **Rule-out other causes of obesity:**
 - ▶ Poor linear growth (hypothyroidism, other endocrine disorders)
 - ▶ Abnormal physical findings and/or developmental delay (Cushings, Prader-Willi, Tumors, other genetic disorders)
 - ▶ Psychiatric medication (2nd gen antipsychotic, risperidone)
 - ▶ Striae, HTN, moon facies, hirsutism (Cushing's)
 - ▶ Accelerated growth (>99.9%ile) before age 2 (genetic mutations of appetite regulation hormones)

▶ Most children w/non-medical cause for obesity will be tall as well as heavy

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Pediatric Obesity Over Time: National



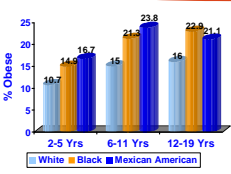
Trends in obesity among children and adolescents aged 2-19 years, by age: United States, 1963-1965 through 2013-2014

SOURCE: Obesity is defined as body mass index (BMI) greater than or equal to the 95th percentile from the age-specific BMI for age 2000 CDC Growth Charts. National Health and Medical Examination Survey, 4 pages 6-11 and 61 pages 61-73, and National Health and Medical Examination Survey Surveillance System (NHANES) 2001-2004, 2005-2006, 2007-2008, 2009-2010, 2011-2012, and 2013-2014.

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WHO IS AT GREATEST RISK?



Age Group	White	Black	Mexican American
2-5 Yrs	10.7%	14.4%	16.7%
6-11 Yrs	15%	21.5%	23.8%
12-19 Yrs	16%	22.9%	21.1%


- ▶ Black
- ▶ Hispanic
- ▶ American Indian/Alaska Native
- ▶ 2nd generation Asian-American
- ▶ Pacific Islander

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Multi-System Effect of Obesity

<p>Pulmonary</p> <ul style="list-style-type: none"> Chest wall mass ↑ CO₂ production ↑ Functional reserve ↓↓ Pulmonary compliance ↓ Total O₂ consumption ↑ Work of breathing ↑ 	<p>Cardiovascular</p> <ul style="list-style-type: none"> Cardiac output ↑ Hypertension Stroke volume ↑ Polyeythemia 	<p>Gastrointestinal</p> <ul style="list-style-type: none"> Intra-abdominal pressure ↑ Intra-gastric pressure ↑ Risk of aspiration ↑ <p>Diseases</p> <ul style="list-style-type: none"> Heart Disease Diabetes OSA
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Adapted from A. Miles

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Obesity+Sleep Apnea+Sedation=**Disaster!**

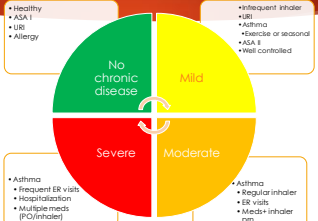
- ▶ Airway, airway, airway
 - ▶ Increased chest mass
 - ▶ Decreased chest movement
 - ▶ Increased work of breathing
 - ▶ Partially-reclining not supine
- ▶ Obesity-hypoventilation syndrome leads to respiratory acidosis
- ▶ Full stomach or slow gastric emptying
 - ▶ High intragastric pressures
 - ▶ Increased chance of regurgitation and aspiration
- ▶ Post sedation recovery
 - ▶ Lengthened because of redistribution of fat soluble drugs
 - ▶ Obstruction



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98

Pulmonary Disease




- No chronic disease:** Healthy, ASA I, URI, Allergy
- Mild:** Intrequent Inhaler, URI, Asthma, Exercise or seasonal, ASA I, Well controlled
- Moderate:** Asthma, Regular Inhaler, ER visits, Meds+ Inhaler, ASA II
- Severe:** Asthma, Frequent ER visits, Hospitalization, Multiple meds (P2/3/4/5), ASA III

99

Upper Respiratory Tract Infections

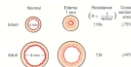
- ▶ Allergic rhinitis
 - ▶ Clear nasal discharge
 - ▶ Symptoms relieved by antihistamine
- ▶ URI:
 - ▶ Yellow or green nasal discharge
 - ▶ Old wives' tale/ not indicative of bacterial or viral infection
 - ▶ Nasal passages not patent
 - ▶ Fever
 - ▶ Cough
 - ▶ Symptoms relieved by antibiotic if bacterial



100

Upper Respiratory Tract Infections


- ▶ Frequent respiratory tract infections result in:
 - ▶ aspiration of secretions
 - ▶ decreased airway radius
 - ▶ increased airway resistance
 - ▶ uneven ventilation and perfusion
 - ▶ modest hypoxemia
 - ▶ pediatric airway is more reactive than adult
- ▶ Pediatric airway smooth muscle is more responsive to stimulation with acetylcholine
 - ▶ due to delayed development of degrading enzymes
- ▶ Pediatric lungs are like asthmatic lungs
 - ▶ Limited FRC
 - ▶ Limited elasticity



101

Upper Respiratory Tract Infections


- ▶ Potential infection of the dental team
- ▶ Cough: irritation of airway more likely
- ▶ If nasal passages not patent
 - ▶ Unable to use nitrous oxide/oxygen
 - ▶ Will not be able to breathe with a rubber dam in place
 - ▶ Irritation of airways from post nasal drip when patient is supine
- ▶ 6 week rule for infection if lungs involved and reactive



102

Pulmonary Disease

- ▶ Asthma
 - ▶ Small increases in edema of periphery significantly decrease the size of the airway and increase resistance
 - ▶ Increased responsiveness of trachea and bronchi to stimuli causing narrowing of the airways
 - ▶ Effects 1 of 7 children in the United States
 - ▶ Cause of most pediatric hospital admissions
 - ▶ Caused by thymic stromal lymphopoietin
 - ▶ Molecule associated with airway inflammation
 - ▶ Characterized by smooth muscle spasm, airway inflammation with edema and mucus hyper-secretion
 - ▶ Higher risk of dental caries




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Asthma and Sedation

- ▶ Higher risk of complications up to 2 weeks following attack – bronchospasm
 - ▶ 9-11x
 - ▶ Borzari, P. (2009). Clinical anesthesia (6th ed.). Philadelphia: Lippincott Williams & Wilkins.
- ▶ Preoperative optimization of medical care
 - ▶ If PRN inhaled β_2 agonists or oral meds
 - ▶ daily administration for 3-5 days prior to appointment
 - ▶ If chronic oral or inhaled meds
 - ▶ Consult with pMD re addition of oral steroids
 - ▶ Consider GA rather than oral sedation
- ▶ Recent exacerbation requiring hospitalization or emergency treatment within 6 weeks of treatment date precludes elective treatment
 - ▶ Postpone elective treatment for 6 weeks even if no wheezing if URI present
 - ▶ 11 fold increase in respiratory complications




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104

Severity Classification of Asthma: After Institution of Therapy

- ▶ Mild
 - ▶ Spasmodic or seasonal
 - ▶ Symptoms 1-2 X /month
- ▶ Moderate
 - ▶ Symptoms >2 X /week
 - ▶ Nocturnal symptoms 4-5 X /month
 - ▶ Symptoms may persist for several days
- ▶ Severe
 - ▶ Symptoms each day and night
 - ▶ ER or medical visits 3 or more times per month
 - ▶ Activity limited



From A. Mbeu

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105


Asthma and Sedation

- ▶ Not all asthma meds are alkile
 - ▶ Bronchodilators open the airway acutely
 - ▶ β_2 Agonist (long and short acting)
 - ▶ Metaproterenol, salbutamol (albuterol)
 - ▶ Adrenergic and anticholinergics
 - ▶ ipratropium
 - ▶ Inflammation counteractors
 - ▶ Leukotriene antagonists (against inflammation)
 - ▶ zafirlukast
 - ▶ Mast cell stabilizers (prevent release of histamine)
 - ▶ cromolyn
 - ▶ Steroids (stabilize cell membranes)
- ▶ IgE blockers
 - ▶ Omalizumab injection
 - ▶ Thymic stromal lymphopoietin blockers
 - ▶ Tezepelumab-ekko

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106

SARS CoVid 19



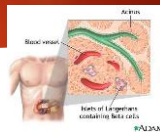
- ▶ Virus infection causes inflammatory response in the lung and throughout the body
- ▶ Screening should begin 2 weeks prior to scheduled procedure
 - ▶ Symptoms: fever, cough, SOB, muscle pain, loss of taste
- ▶ Testing
 - ▶ In high Covid areas: 2/day PCR
 - ▶ In low Covid areas: wait for 90 days if symptoms don't recur
 - ▶ Test Δ 10 days before procedure
- ▶ Significantly increased risk of pulmonary complications 7-8 wks AFTER dx of Covid 19
 - ▶ 30 day mortality increased, pulmonary complications increased by 51%
 - ▶ Asymptomatic pts: comps slightly less
 - ▶ Symptomatic who waited 7 weeks after dx: comps down
- ▶ <https://www.sciencedirect.com/science/article/pii/S0954682020302616>
 - ▶ <https://www.sciencedirect.com/science/article/pii/S0954682020302616>
 - ▶ <https://www.sciencedirect.com/science/article/pii/S0954682020302616>

March 2022

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107

Type 1 (Juvenile) Diabetes



- ▶ Significant increase in numbers
- ▶ Inability to produce insulin
 - ▶ Autoimmune reaction to pancreas
 - ▶ Requires monitored insulin dose
- ▶ Type 2 is inability to respond to insulin-increasing exponentially- 16-30%
 - ▶ Metabolic syndrome is diagnosed in people who have at least three of these five criteria: high blood pressure, insulin resistance, high triglycerides, a large waist and low levels of HDL ("good") cholesterol.
 - ▶ Learning disabilities/ brain development occurs if onset <5y.o, possibly b/c glucose deficit affects nerve development

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108

Type 1 (Juvenile) Diabetes

- ▶ Diagnosis
 - ▶ Extreme thirst
 - ▶ Frequent urination
 - ▶ Drowsiness, lethargy
 - ▶ Sugar in urine
 - ▶ Hypoglycemia
 - ▶ Sudden vision changes
 - ▶ Increased appetite
 - ▶ Sudden weight loss
 - ▶ Fruity, sweet, or wine-like odor on breath
 - ▶ Ketonuria
 - ▶ Heavy, labored breathing
 - ▶ Stupor, unconsciousness



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109

Type 1 (Juvenile) Diabetes

- ▶ Multisystem effect
 - ▶ Diabetic triopathy:
 - ▶ Retinopathy
 - ▶ Neuropathy
 - ▶ Nephropathy
 - ▶ Oral
 - ▶ Increased plaque/ decreased saliva
 - ▶ Elevated glucose levels/increased bacteria counts
 - ▶ Loss of collagen in gingiva
 - ▶ Vascular disorder/reduced circ. in gingiva
 - ▶ Poor healing



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110

Type 1 (Juvenile) Diabetes

- ▶ Controlled by
 - ▶ Diet
 - ▶ Exercise
 - ▶ Insulin
- ▶ May be at risk for hypoglycemia and insulin shock if NPO orders followed
- ▶ Individual case consultation
- ▶ Monitor by HbA1c
 - ▶ Should be less than 6% (BS 120)
 - ▶ >8.5% (BS>210) poor with significant complications
- ▶ For sedation
 - ▶ NPO rules
 - ▶ First appointment
 - ▶ Insulin when patient able to resume normal food intake
 - ▶ See SABS

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111

Developmental Disabilities

- ▣ Are birth defects related to specific organ or system manifested before 18 yo
- ▣ Refers to disabilities affecting daily functioning in three or more of the following areas:
 - ▶ capacity for independent living, economic self-sufficiency, learning, mobility, receptive and expressive language, self-care, and self-direction

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112

Developmental Disabilities

- ▶ Maybe caused by:
 - ▶ Brain injury or infection perinatally
 - Problems with growth and development
 - Nutrition or metabolic
 - ▶ Prenatal maternal health care
 - Diet, alcohol, drugs, smoking
 - ▶ Chromosomal or genetic malformations
 - ▶ Prematurity
 - ▶ Child abuse
 - Early sensory development/sound
- ▶ Are not acquired after birth but may be evident and diagnosed after birth
- ▶ Does not include traumatic injury and neurologic loss

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113

ADD/ADHD and Autistic Spectrum Disorders

- ▶ Autism spectrum disorders
 - ▶ Affects communication and social skills and intelligence
 - ▶ Affects ~1/150 live births, M>F
 - ▶ May be identified at 1 month of age
 - ▶ May be mild to severe
 - ▶ IQ range
 - ▶ Repetitive behaviors/specific routines
 - ▶ May have folate metabolism defect via MTHFR gene mutation (methylene tetrahydrofolate reductase) which may lead to myelinization problems by blocking methionine synthase
 - DARS (Defeat Autism Now!) and vit B12/folate pathway defect
 - ▶ Glutathione deficiency
 - Possible detoxification problem
 - ▶ Behavior modification therapy may be adjunct



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ADD/ADHD and Autistic Spectrum Disorders


- ▶ Genetic basis
 - ▶ 25% have relative with spectrum disorder
- ▶ May give idiosyncratic reactions to sedative meds
 - ▶ GABA/chlorine uptake blocking mechanism of the benzodiazepines and loss of inhibition
- ▶ Should take ADD meds prior to sedation
- ▶ Be careful of herbal medications and chelating agents given by holistic MDs
 - ▶ Compete for bonding sites on Cytochrome P450

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Developmental Disabilities

- ▶ Attention Deficit Hyperactivity Disorder
 - ▶ Amphetamines
 - ▶ Should not be discontinued
 - ▶ Fear of overdose
 - ▶ HIN, tachycardia, hyperthermia
 - ▶ Depletion of body catecholamines
 - ▶ Methylphenidate (Ritalin, Concerta)
 - ▶ Should not be discontinued



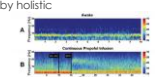
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116

ADD/ADHD and Autistic Spectrum Disorders

- ▶ May give idiosyncratic reactions to sedative meds
 - ▶ GABA/chlorine uptake blocking mechanism of the benzodiazepines and loss of inhibition
- ▶ Should take ADD meds prior to sedation
 - ▶ Methylphenidate increases speed of recovery
 - ▶ Chemol, J. J., Van Dort, C. J., Brown, E. N., Salt, K. Active emergence from propofol general anesthesia is induced by methylphenidate. *Anesthesiology*, 5, May, 2012, 998-1005.
- ▶ Be careful of herbal medications and chelating agents given by holistic practitioners
 - ▶ Compete for bonding sites on Cytochrome P450




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117

Child Behavior and Parent Management

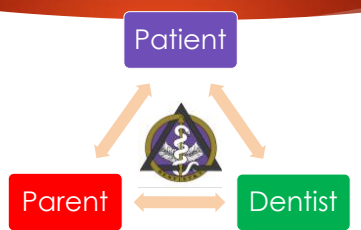
The Triad



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118

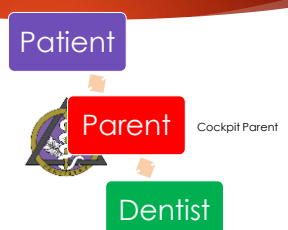
Parenting, Psychology and the Family



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119

Parenting, Psychology and the Family



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120

Choosing the Child for Sedation




The Simpsons
Season 4
Episode 17

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121

Parents ask more questions today


- ▶ buying your time and expertise
- ▶ informed consumer
- ▶ lay publications
- ▶ internet
- ▶ don't want to be taken by surprise
- ▶ want you to think of them as intelligent



122

Parenting Today

▶ It's not the lives they've led




123

Parenting Today


▶ It's the books (Internet) they've read!

- ▶ Google University
- ▶ PhD in Googleology



124

Mouthhealthykids.org



125

2min2x.org



126

mouthmonsters.mychildrensteeth.org



127

Preparing the Office

- ▶ Staff meetings
- ▶ Office sop's
- ▶ Many handouts
- ▶ Practice



128

Rule # 1

- ▶ Children are the most important thing to parents



129

Rule # 2

- ▶ Treat parents' questions with respect



130

Rule # 3

- ▶ Parents bring their own anxieties into the office



131

Rule # 4

- ▶ Never answer a negative question or answer a question while on the defensive
- ▶ Always answer in the positive



132

Rule # 5

- ▶ Remember that the questions are not personal assaults on you



133

Rule # 6

- ▶ Remember that you are representing the office



134

Rule # 7

- ▶ Never argue



135

Rule # 8

- ▶ Never assume the parent understands dental or medical terminology



136

Rule # 9

- ▶ Speak at the parent's comprehension level



137

Rule # 10

- ▶ Big words don't mean you're smarter



138

Rule # 11

- ▶ Open body posture and make eye contact



139

Rule # 12

- ▶ Believe in what you're saying



140

Rule # 13

- ▶ Get confirmation of understanding



141

Rule # 14

- ▶ Always talk with an incensed parent in private and out of view



142

Rule # 15

- ▶ Try not to instill guilt or blame



143

Rule # 16

- ▶ Thank the person for asking the questions



144

Rule # 17

- ▶ Take time to formulate a good answer



145

Rule # 18

- ▶ Try to answer the question the parent is really asking



146

Rule # 19

- ▶ Always remember that you are treating the parents as much as the child!



147

Be Available for Calls and Emergencies

- ▶ You don't always have to be in the office
- ▶ Gen x-ers and Millennials love e-mail and cell phones

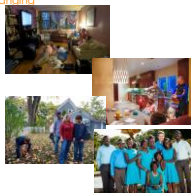


148

The Changing American Family

The New York Times

- ▶ American households have never been more diverse, more surprising, more baffling. Science Times [1/27/2013]. NATALIE ANGLIER: changing definition of family.
 - ▶ Birth rates are down
 - 1/2 of 1960
 - Children are 23.5% of the population
 - Children/family in 2012 = 3 in 1970s
 - ▶ Middle Class families spend \$241,080 to age 18 not counting college or grad schools
 - ▶ Marriage rate declined
 - 41% of babies born out of wedlock
 - Less education, greater chance of child out of wedlock
 - Cohabiting couples increased
 - ▶ Divorced folks have dropped!!
 - 40% for first time marriages
 - 30% for in middle and upper-middle class
 - Baby boomers 50%



149

The Baby Bulge as Bling!



150

Raising children has rated very near to sex - and to success - as an American fixation. Raising America by Ann Hulbert, 2003



How AP Do You Want to Be?


To learn your ideal level of Attachment Parenting, choose the number between 1 and 10 that most accurately rates your parenting goals and abilities in each category. When you're done, add up these numbers and read your corresponding AP profile.

FEEDING	1	2	3	4	5	6	7	8	9	10
Formula feeding vs. on-chest/IB										
Always respond to crying from other babies by bringing them into a room?										
Use scheduled feeding and sleeping schedules?										

151

Should Children Cry? (or should we ALLOW them to cry?)

- ▶ Normal human babies cry 2 hours/day
- ▶ Physically, neurologically and primarily intertwined with breathing
 - ▶ Linked by a cluster of cells in the hindbrain
 - ▶ Fast, active respiration
- ▶ Attracts adults to care for baby
 - ▶ All mammalian species respond
 - ▶ Cries are similar
 - ▶ Mammals that don't cry are ignored by parents
- ▶ Birchmeier, C, Hernandez-Miranda, L: Proceedings of the National Academy of Sciences 2017




NYTimes.com/ 2017/09/04/science/crying-babies-animals.html

152

And What About That Cry? Or: What's my little darling saying?


- ▶ Related to the gene that controls stress reaction and cortisol release
 - ▶ Sheinkopf, S, Lester, B, Brown University
- ▶ Analyzed by Cholz, M, Spanish J of Psychology
 - ▶ Angry babies
 - ▶ Eyes half closed gazing off to the side
 - ▶ Crescendo
 - ▶ Frightened babies
 - ▶ Hesitation, tensing of facial muscles, explosive cry and eyes open
 - ▶ Pained babies
 - ▶ Cried out immediately, squeezed eyes shut



153

And Finally: How and Why Do You React?

- ▶ Babies cries change tone and falls and rises unpredictably
- ▶ Adults are wired to respond
 - ▶ Infants depend on adults for survival
 - ▶ Response comes from periaqueductal gray matter in midbrain
 - ▶ 2x faster than any other response
 - ▶ Do or die response
 - ▶ Motor areas fire for quick movement



154

And What About Breast Feeding?

- ▶ Provides comfort, warmth, psychological well being, nutrition, maternal antibodies
- ▶ Better shaped jaw and positioned teeth with correct tongue position
- ▶ Milk thins from high fat to low fat around 1 yr of age
- ▶ Higher risk of caries in children breastfed after 24 mos
 - ▶ Usually on demand
 - ▶ Poorer OH and food removal
- ▶ Pediatrics(2017); doi:10.1542/peds.2016-2943




I am a Breastfed Baby.

Owensboro Hospital

155

The Breastfed Baby



- Respiratory system:** Responds faster to nociceptors. Babies suck only to secure oxygen system. Prevents risk of childhood cancer.
- Eyes:** Visual acuity is higher in breast fed babies than in formula fed.
- Brain:** Less allergic reactions in breastfed infants.
- Stomach and intestines:** Infants who are breastfed are less likely to require antibiotics or have diarrhea. Infants who are breastfed.
- Beneficial:** Gut microorganisms.
- Stomach tract:** Infants who are breastfed are less likely to have diarrhea.
- Aggression:** Children with early exposure to breast milk are less likely to be aggressive.
- Behavioral:** With milk and other breast products, babies are less likely to be aggressive.
- Signaling system:** Breast milk contains antimicrobial peptides that act as local antibiotics. Also, breast milk contains signaling molecules that act as hormones.
- Immune system:** Breastfed babies have better and less severe upper respiratory infections, less eczema, and less gastrointestinal and less infections.
- Respiratory system:** Breastfed babies have better and less severe upper respiratory infections, less eczema, and less gastrointestinal and less infections.
- Heart and circulatory system:** Breastfed babies have better cholesterol and less heart stress and are more in breastfed infants.
- Weight gain:** Breastfed babies get better use of calories from breast milk. Breastfed babies have better and less severe upper respiratory infections, less eczema, and less gastrointestinal and less infections.
- Brain:** Less need for antibiotics or other medical treatment because of immune system development of the breast. Breast milk changes on the basis of breast milk. Changes in the basis of breast milk. Changes in the basis of breast milk.

156



157

Changes in Practitioner's Management of Patients

- ▶ Since beginning of practice
- ▶ Casamassimo, Wilson & Gross, 2002

Management technique	Increased	No change	Decreased
Parents in operatory	64	28	6
Sedations	38	31	31
HOM	1	17	82
Medical Immobilization	7	40	53

158

Pediatric Dentists Believe Parenting Has Changed!

- ▶ Limit Setting diminished
- ▶ Less likely to use physical discipline
- ▶ Parents are unsure of their role as parents
 - ▶ CEO v consultant v best friend
- ▶ Too busy to spend time with children
- ▶ Too self absorbed/materialistic/outward oriented/concerned with status
- ▶ Overinvolved/ underinvolved/ controlling



159

The Helicopter Parents



AKA Velcro Parents



160

Lawnmower Parents



161



162

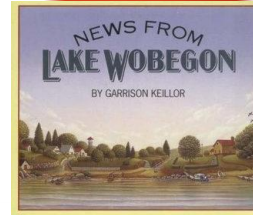
Millennials as Parents!

- ▶ Drone parenting
- ▶ Group parenting decisions
 - ▶ Forums
- ▶ Every action Instagrammed
- ▶ Less scheduled/free child-controlled play
- ▶ Democratic families/ consensus
- ▶ Electronic learning
- ▶ Change in standard parenting roles
 - ▶ Less likely to be named
 - ▶ Stay-at-home dads



163

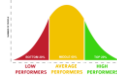
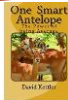
Every Child is Above Average



164

Being Average is OK!

- ▶ One Smart Antelope: the Power of being Average
 - ▶ David Alan Kettler
 - ▶ Traveling through life in the middle of the pack
- ▶ In Defense of Being Average
 - ▶ Mark Manson
 - ▶ <http://markmanson.net/being-average>
 - ▶ Accepting mediocrity when there are comic book superheroes around
 - ▶ "Which leads to an important point: that mediocrity, as a goal, sucks. But mediocrity, as a result, is OK."
- ▶ The Benefit of Being Average
 - ▶ Time magazine 2015



165

Teacups



- ▶ Universities have adopted an informal "Dean of Parents"
- ▶ Parents are escorted off campus after freshman orientation
- ▶ The fragile, never say no, grade inflated child on a college campus is referred to by many Deans and College Presidents as "Teacups" because he/she is so fragile and can't accept failure
 - ▶ Universities have had to hire more counselors
- ▶ Failure is the best teacher

166

Why?

- ▶ Societal changes toward liberalism and breakdown of norms
- ▶ Divorce and multiple homes
- ▶ Working parents
- ▶ Hectic lifestyles
- ▶ Loss of extended families
- ▶ Increased stress of maintaining lifestyles
- ▶ Frequent relocation



Frank N. Long, PhD after
Cassamatta, et al

167

Parenting

- ▶ Behavioral/Genetics Theory
 - ▶ Genes and peers control behavior
 - ▶ Parents are unimportant in personality and character development
- ▶ Current Theory
 - ▶ Complex interplay of interactions and moderating effects of biological, environmental and social factors
 - ▶ Eg. Meanness is not psychopathic, it's behavioral (NYT 2/6/07)
 - ▶ Smithsonian Magazine Feb. 2013



168

Parents Have the Power!

- ▶ They can influence:
 - ▶ Behavior at home
 - ▶ Leisure-time activities
 - ▶ Profession
 - ▶ Religion
 - ▶ Political preference
 - ▶ Child friendships (age limited)

From Harris, 1998



169

How Much Power?

- ▶ Moderated by other variables which affect child's behavior and adjustment
- ▶ Eleanor Maccoby, Stanford U., suggests parenting variables account for 20-40% of child outcome



170

The Power of No (Newsweek, 2004)

- ▶ Affluence yields
 - ▶ overindulgence
 - ▶ Can afford to say yes
 - ▶ Give kids advantage
 - ▶ Consumerism
 - ▶ Less responsibility at home
- ▶ Overindulgence yields
 - ▶ Self-centered child
 - ▶ Difficulty coping with life's disappointments
 - ▶ Sense of entitlement impacts success in workplace and relationships
 - ▶ Be vulnerable to anxiety and depression



171

Parenting Stress

- ▶ Inconsistent parenting
- ▶ Decreased monitoring and setting consistent limits
- ▶ Less proactive/more reactive
- ▶ Harsh discipline
- ▶ Decreased quality of parent-child relationships
- ▶ Less involvement between parent and child



172

Specific Stressors

- ▶ Financial pressures
- ▶ Decreased time for parenting
- ▶ Daily hassles
- ▶ Sleep deprivation
- ▶ Increased choices



173

Too Many Choices! Analysis Paralysis

- ▶ Simple processes become more complex
 - ▶ What's the BEST choice v what's good enough?
 - ▶ Analysis paralysis leads to increased stress and shutting down
 - ▶ High expectations with resultant failure
- ▶ As choices increase
 - ▶ Decisions require more effort
 - ▶ Mistakes are more likely; perceived as real
- ▶ Too many parenting choices of techniques
 - ▶ Increases inconsistency, anxiety and failure
- ▶ "The Art of Choosing", Sheena Iyengar, PhD, Professor, Columbia University, 1995
 - ▶ Pick 1 of 3 leave 2 behind
 - ▶ Pick 1 of 20 leave 19 behind
 - ▶ Greater # left behind, greater disappointment




174

Behavioral Scales

Behavioral Scale

Frankl #1


- (-) Defiant, Negative
- Refusal of treatment
- Copying family/du
- Phobic
- Excessive negativism



Behavioral Scale

Frankl #3


- (+) Phobic
- Anxious/withdrawn
- Cautious (not smiling)
- Refuses treatment



Behavioral Scale

Frankl #2


- (-) Negative
- Reluctant
- Disorganized
- Limited negativism
- Mullen, withdrawn



Behavioral Scale


Frankl #4

- (+) Defiantly Positive
- Cloud rapport
- Interested in dental procedure
- Laughs and enjoys



175

Behavior Management in Children and Especially Parents



176

Behavior Management in Children

- ▶ Non-pharmacologic
 - ▶ Exploration/Modeling
 - ▶ Tell/Show/Do
 - ▶ Desensitization
 - ▶ Distraction
 - ▶ Voice Modulation
 - ▶ Behavior Modification
 - ▶ Pedi-wrap/papoose/medical immobilization device



177


Behavior Management in Children

- ▶ Pharmacologic
 - ▶ Used in conjunction with non-pharmacologic
 - ▶ Inhalational
 - ▶ N₂O/O₂
 - ▶ Oral (Enteral) Sedation
 - ▶ Benzodiazepine/Narcotic
 - ▶ Sedation (Parenteral)
 - ▶ General Anesthesia



178


If only it was this simple!



179

Be yourself but keep talking


- ▶ Children hate silence
- ▶ Learn the current TV and pop stars
- ▶ Age appropriate banter
- ▶ Compliment clothing (no matter how despicable)



180

Choosing the Behavior Management Technique for Ma and Pa


- ▶ Family
 - ▶ The "make it or break it" factor
 - ▶ Preconceived notions
 - ▶ child "needs" sedation
 - ▶ "won't do well"
 - ▶ "is anxious"
 - ▶ "Don't want sedation, GA, restraints, etc..."
- ▶ Their past experience
 - ▶ Transferred or projected feelings
- ▶ Requests
 - ▶ "no pain"
 - ▶ "don't want my child to remember..."
- ▶ Their needs
 - ▶ One visit
 - ▶ Multiple visits



181

Parents Out of the Treatment Room

- ▶ Pros
 - ▶ No hindrance therefore faster
 - ▶ Only one explanation needed
 - ▶ Children may behave better without the parent
 - ▶ Behavior management is more immediate
 - ▶ Child doesn't perceive harmful situation "save me"
- ▶ Cons
 - ▶ Two explanations needed means more time
 - ▶ Return to parent for procedural change
 - ▶ Child lacks parental support
 - ▶ What do you do at the MD?



182

Parents In the Treatment Room

- ▶ Pros
 - ▶ Supports child
 - ▶ Observe procedure and difficulty
 - ▶ Decrease office time
 - ▶ Immediate informed consent
 - ▶ Liability issues
- ▶ Cons
 - ▶ In the way
 - ▶ Over involved
 - ▶ Take over
 - ▶ More time to explain



183


Parental Presence During Induction of Anesthesia (PPIA)

- ▶ PPIA
 - ▶ Predicting which child-parent pair will benefit from parental presence during induction of anesthesia: a decision making approach. Kain et al. Anes Analg 102:1, pp81-84, 2006
- ▶ CC+CP= **NO CHANGE**
- ▶ CC+AP= **AC**
- ▶ AC+CP= **CC**
- ▶ AC+AP= **DISASTER!!!**

Calm Child	Calm Parent
Anxious Child	Anxious Parent

184


Help Me!



185

Rules of the Continuum of Behavior Management

- ▶ It is not linear
- ▶ It is not one way
- ▶ It is okay to combine techniques
- ▶ On different days, the same child will need different techniques
- ▶ Be flexible/ give the child the benefit of the doubt
- ▶ Define or modify your definition of success



186

Communication

- ▶ Still possible!



187

Exploration/Modeling



188

Tell/Show/Do

- ▶ Tell once/show once/do once
 - ▶ Set limits on negotiations
 - ▶ Always have a mirror



189

Desensitization

- ▶ Expose by working up to the event
- ▶ Start on hand where the child can see and move towards mouth



190

Distraction

- ▶ Take attention away from procedure through Ericsonian hypnosis
 - ▶ Visual
 - ▶ Auditory
 - ▶ Engaging activity
 - ▶ Storytelling
 - ▶ Singing
 - ▶ Counting
 - ▶ Deep breathing



191

iPads and Injections

- ▶ CHILD LIFE IPAD DISTRACTION: A PSYCHOSOCIAL TOOL FOR CHILDREN RECEIVING AN INJECTION. S Afencio, U. Alabama 2015
- ▶ "...children receiving distraction during the injection using a tablet reported higher pain, both observed and self-reported, and more negative emotions showing distress"
- ▶ "This finding suggests that children who received distraction using the tablet displayed less coping than those who received routine care"



192

Distraction

- ▶ Computer Tablet Distraction in Children Receiving an Injection
 - ▶ Sherwood Burns-Nader, PhD, CCLS, Stephanie Atencio, MS, CCLS, Magdalena Chavez; Pain Med (2016) 17 (3): 590-595.
- ▶ 41 children, randomized, received injection
- ▶ A significant difference was found for pain, both self-reported and observed, and observed emotions. Children receiving distraction using a tablet displayed significantly higher amounts of pain and negative emotions. Gender differences in pain and emotions were found with females having a significantly higher amount of pain and negative emotions.

193

Another iPad View

- ▶ The iPad provides effective distraction for induction of sedation/general anesthesia or reduction of injection pain.
- ▶ Also may be more effective than parental presence for reducing anxiety.
- ▶ McQueen A, Cress C, Tothy A. Using a tablet computer during pediatric procedures: A case series and review of the "Apps". Pediatr Emerg Care 2012;28:712-714.

194

Smile!

- ▶ Research has shown that if a patient smiles during a painful procedure they experience less pain
- ▶ Sardonic smile



The Emoji by Unknown Author's licensed under CC BY-SA.

195

Voice Modulation

- ▶ Raising or lowering volume, tone or inflection
- ▶ Not well accepted by parents
- ▶ May signal displeasure
- ▶ Follow by positive reinforcement



196

Behavior Modification

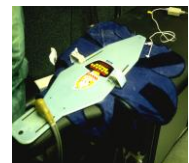
- ▶ Positive reinforcement
- ▶ Follows desirable behavior
- ▶ Work up to goal
- ▶ Positive or negative reinforcement may be used
 - ▶ Long term effects are eliminated
- ▶ The TOY is KING!
 - ▶ Remembered long after the visit is over



197

Medical Immobilization Device

- ▶ Papoose board, Restraining device, soft wrist restraints, head immobilizers
- ▶ Mustn't be tightened such that it causes injury or restricts ventilatory movements
- ▶ Must allow free access to monitors
- ▶ Office protocol for use (prevents accusations of assault or child abuse)
 - ▶ i.e., 15 min in unsedated child except in emergency
- ▶ Consent for use
 - ▶ May have parent assist in placement of child
- ▶ Neck roll to open airway



198

CONSENT FOR THE USE OF PATIENT'S IMAGE

It is internationally recognized customary in pediatric dentistry, to identify procedures, techniques and use of computers in order to produce safe, comfortable and quality dental treatment. These activities are usually very simple, efficient and they are internationally practiced.

A photograph which we use for identifying those special children in the subject, should be provided with their own or their parent or guardian's consent. Parents and they do not understand the use of this.

We will be happy to answer any questions you have. By signing below you give us your consent to use your child's name and picture in the subject of the University of Iowa, University of Iowa Hospital and in publications and journals of our office. Your consent is not necessary for the use of your child's name and picture in the subject of the University of Iowa Hospital and in publications and journals of our office. Your consent is not necessary for the use of your child's name and picture in the subject of the University of Iowa Hospital and in publications and journals of our office.

Thank you for taking the time to read and sign this document.

PARENT/PATIENT'S NAME _____ YOUR SIGNATURE _____

PATIENT'S AGE _____ PARENT'S NAME _____

ADDRESS _____ YOUR RELATIONSHIP TO PATIENT _____

DENTAL NUMBER _____ DENTAL CLINIC _____

Write Date Patient: _____ Write Date: _____

Liability

199

Pain Control in Children

- ▶ Necessary for successful treatment
- ▶ Poor pain control often misinterpreted for disruptive behavior
- ▶ Requires special understanding of physiology and psychology of children



200

Pain in Children

- ▶ The response to the sensation of pain is often confused for disruptive behaviors
- ▶ May be socialized but is real
- ▶ Must be recognized as an important entity
- ▶ Changes in physiologic parameters
- ▶ Difficult to assess in children under 6
 - ▶ Use observation
- ▶ Self reporting in children over 6
 - ▶ Pain scales
- ▶ *It is the key to a successful treatment (child and parent!)*



201

Pain Control in Children

- ▶ Necessary for successful treatment
- ▶ Poor pain control often misinterpreted for disruptive behavior
- ▶ Requires special understanding of physiology and psychology of children



202

Don't waste your money on expensive anesthetics

- ▶ 2% Lidocaine with 1:100000 epi
 - ▶ Wide margin of safety
 - ▶ Full mouth with two cartridges
 - ▶ Lasts too long!
 - ▶ Amide anesthetic
 - ▶ Metabolized in the liver
 - ▶ High pKa therefore slower dissociation to free base
 - ▶ Infection has lower pH: limits free base
- ▶ 4% Articaine with 1:100000 epi
 - ▶ Amide/ester
 - ▶ Transient methemoglobinemia



203

Commonly Used Local Anesthetic Agents Dose Recommendations from AAP/AAPD

Drug	Maximum dose with epinephrine (mg/kg)	
	Medical Use	Dental Use
Lidocaine	7.0	4.4
Articaine	7.0	7.0 (4.4)

■ Determined by relative vascularity of injection area
 Guideline for Monitoring and Managing Pediatric Patients During and After Sedation for Diagnostic and Therapeutic Procedures, AAPD Reference Manual 2006-2007

204

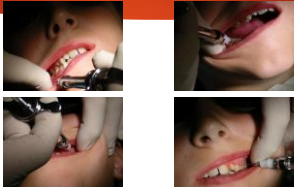
Moore's Rule of 25

- ▶ One cartridge/25 lbs(11 kg) body weight
- ▶ Any marketed local anesthetic used in dentistry
- ▶ Establishes a conservative dose
- ▶ Examples:
 - ▶ 50 lbs.(22 kg) 2 carpules
 - ▶ 75 lbs. (33 kg) 3 carpules
 - ▶ 100 lbs. (44 kg) 4 carpules
- ▶ May be too conservative in preschool child
 - ▶ More accurately 1 carpule/22 lbs (10 kg)
- ▶ mg/kg calculation provides greater accuracy

Moore P., Manual of Local Anesthesia, 4th ed, Eastman-Kodak Co., Rochester, NY, 1996


205

Infiltration Technique



206


Choosing the Child for Sedation



- ▶ My reply:
 - ▶ "If I only had a magic wand..."
 - ▶ "Treatment is like changing a tire on a car moving at 30 mph..."
 - ▶ "In a healthy child, general anesthesia is as safe if not safer..."
 - ▶ "If you don't want your child to cry at all..."
 - ▶ "If your pediatrician said your child needed ear tubes..."

207

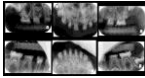
Changing a Tire at 50 mph



208

Choosing the Child for Sedation


- Severity of treatment/disease
 - Extent
 - Complexity
 - Time and number of visits required
 - Cost
 - Multiple sedations v. single GA
 - Time off from work
 - Time out of school
- Is "monitored neglect" with "preventive intervention" an option?
 - Fluoride varnishes
 - Glass ionomers/ART



209

Choosing the Child for Sedation

- ▶ Medical status
 - ▶ ASA 1 or 2
 - ▶ Airway patency
 - ▶ Age: what is too young to sedate?
- ▶ Age
 - ▶ Cognitive v. physical
 - ▶ Delay?



210

The Ideal Sedative

- ◆ Reduces fear and anxiety in children
- ◆ Decreases inhibitory behavior
- ◆ Provides amnesia
- ◆ Maintains cardiovascular and respiratory tone
- ◆ Does not cause drowsiness or sleep



211

The Ideal Sedative

- ◆ Decrease patient treatment time by decreasing behavior management time
- ◆ Increase treatment efficiency
- ◆ Low cost to office
- ◆ Low cost to family
- ◆ Easily reversed agent/ for duration of treatment



212

The Ideal Sedative

- ◆ Long shelf life
- ◆ No side effects or allergenicity
- ◆ Is safe
- ◆ Works all the time predictably
- ◆ Single agent



213

The Ideal Sedative

◆ DOES NOT EXIST



214

Inhalation

- ◆ Safe
- ◆ Effective
- ◆ Quickly and easily reversible



215

Nitrous Oxide/Oxygen Analgesia

- ◆ Provides anxiolysis
- ◆ Reduces gagging
- ◆ Works on opioid receptors and reduces pain
- ◆ Provides amnesia
- ◆ Provides distraction
 - ◆ Mask blocks sight lines
 - ◆ Covers smells
- ◆ Prolongs treatment times
- ◆ Potentiates the effects of other sedatives
- ◆ Improves behavior over sequential visits
- ◆ Decrease adverse incidents

216

Nitrous Oxide/Oxygen Analgesia

"A mixture of 93% nitrous oxide and 7% oxygen is inhaled until the third stage of anesthesia is attained (the pupils of the eyes turn up and become fixed) in about one minute. When too much nitrous oxide is given the patient usually becomes cyanotic and bridging may occur, which may be overcome quickly by the administration of a small portion of oxygen"

John Brauer, *Dentistry for Children*, 1947



217

Nitrous Oxide/Oxygen Analgesia

- ◆ Acceptable to parents
- ◆ Inhalation analgesia/anxiolytic/CNS depressant
- ◆ 40:60-50:50 concentration
- ◆ 2-4 min onset/ 5 min recovery
- ◆ Diffusion hypoxia is theoretical
- ◆ Equipment costs
- ◆ Initial setup
- ◆ Maintenance and monitoring
- ◆ No electronic or mechanical monitors
- ◆ Allows decrease in L.A.
 - ◆ 40%–4mg MSO_2 in closed system
- ◆ Weak anesthetic
- ◆ $\text{MAC} > 100$ (the hypoxia kills them)



218

And The Secret of Pediatric Dentistry Is Finally Revealed!

219



220

Tips to Make It Through a Day

- ▶ Always give options but...
 - ▶ Never ask a question to which no is the unintended answer
- ▶ If a situation escalates to the point where you are getting uncomfortable...
 - ▶ Walk away for a few moments
- ▶ Always go home feeling good about what you've done and whom you've treated



221

The End!?!

- ▶ Or is it just the beginning?

222

Join us



223

“It took a lot of blood, sweat and tears to get to where we are today, but we have just begun. Today we begin in earnest the work of making sure that the world we leave our children is just a little bit better than the one we inhabit today.”

Barack Obama



224

Enjoy yourself!



225