



A Continuing Dental
Education Program Endorsed
by the American Academy of
Pediatric Dentistry

E-quiz code: 31885N

Issue Highlights

These articles have been selected by the Coordinating Editor as Key Reviews.

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Filling in the Gaps: POWER Program

Because children tend to see dentists more than any other doctor, it is important for you to provide them with resources and activities to combat childhood obesity

By Amanda E. Garant, BS, MS

As you are well aware, there are many health consequences related to childhood obesity, including coronary heart disease, stroke, hypertension, type 2 diabetes, cancer, high total cholesterol, liver and gallbladder disease, sleep apnea, respiratory problems and even health complications including infertility and mental health conditions. Most of these disease states were perceived as adult-onset disease states, but we are seeing more and more of them in our children in the Pediatric Overweight Education and Research (POWER) program at Riley Hospital for Children in Indianapolis, Indiana, where I am a registered dietician. For example, sleep issues are so common now that most of our patients are scheduled for a sleep study right after their initial assessment. So why is obesity becoming and continuing to be such a concern with our youth? The list could go on and on, but many common issues we see are the increased amount of sweetened beverages consumed, that people are eating out and choosing processed foods, they are making poor snack choices, they are skipping meals, they lack variety in the diet, they have little to no activity, there is an increased amount of screen time including video games and texting, and they are eating little to no fruits or vegetables. As our program works together, we have three main missions — promote healthy lifestyles in children with obesity, advance education in the field of pediatric obesity and foster research in pediatric obesity. We feel the more healthcare providers that are on board with fighting this battle, the better chance we will have to make the new generation the healthy generation.

The POWER program was established in October of 2008 and has grown tremendously since its inception. POWER has had about 2,500 referrals, and we have seen over 1,000 patients. As we have continued to grow, we realized the need for all health

professionals to work together to reduce this epidemic of childhood obesity. Approximately one-third of our children and adolescents are obese or overweight, and this number has tripled since 1980. Another common trend that we see is Hispanic boys age two to 19 years are

significantly more likely to be obese than non-Hispanic Caucasian males, and non-Hispanic African-American females were significantly more likely to be obese than are non-Hispanic Caucasian females.

The POWER program is a multidisciplinary, multi-pronged obesity program. We try as a team to fight obesity from all directions. Our team includes a registered dietician, a physical therapist, a psychologist and then our medical team including a doctor or nurse practitioner. Our program is a six-month program. At the initial appointment, families will meet with all providers on the team for a one-on-one visit and initial assessment. After the initial assessment, they will rotate through each provider every one to two weeks until they have seen everybody at least two times. When they have completed this first phase, patients move on to the follow-up phase, which consists of monthly evening group sessions. The family will have a final appointment with a member of the medical staff before completion.

With any change, the entire family needs to be on board. We have found children having little to no success when parents do not get involved.

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Media: Internet access to pdf.

Intended Audience: Pediatric Dentists and others interested in pediatric dentistry.

Educational Objectives: This program is designed to provide the participant with a bi-monthly overview of the most current, clinically useful information available in contemporary journals. Advances in the diagnosis and treatment of primary and comprehensive preventive and therapeutic oral health care for infants and children through adolescence, including those with special health care needs will be covered. It is designed to expand upon, reinforce and give additional perspective to the participant's own selection of journal readings.

Completed continuing education hours help meet the CDE requirements for many state dental boards, state and local associations and hospitals and clinics. Since criteria vary, participants are advised to check directly with the appropriate board or organization for applicability of 2.0 hours in Category 1 credit toward the AMA Physicians Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the activity.

Controversies, advantages and disadvantages of diagnosis and treatment plans are emphasized.

After completing each month's activity, the participant is expected to have a working familiarity with the most clinically important information and perspectives presented.

Special Prerequisites for Participants: There are no prerequisites for participants.

Accreditation: Practical Reviews in Pediatric Dentistry is endorsed by the American Academy of Pediatric Dentistry.

Designation: Earn a Maximum of 2 CE credits per issue from the American Academy of Pediatric Dentistry.

Estimated Time to Complete Each Issue: 2 hours.

Minimum Performance Level: Questions should be answered based on the information presented in the issue within 24 months of publication date, and 70% of questions must be answered correctly to pass the quiz and receive credit for the issue.

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As you will realize, I continue to say *family* rather than *child*. With any change, the entire family needs to be on board. We have found children having little to no success when parents do not get involved. Our success stories almost always have at least one family member committed to helping. This is important when you discuss any medical health change for a child. Get the family involved as much as you can. To measure the success, we use three different methods: Families are assisted with reaching healthy goals pertaining to physical fitness, eating habits, weight and improvement in medical conditions. We also have families use pedometers and journaling to track their physical activity and nutrition. And at each clinical visit we obtain height, weight and body mass index (BMI).

Common Obstacles

Since children and families see the dentist on a regular basis far more times than they see any other healthcare provider, it is important for you to understand how you can help and understand the obstacles you might face. Obstacles we see includes the family's readiness to change. Unfortunately, you cannot make the changes for them. They have to want to make the changes. The family's perception of eating habits and lifestyles is another obstacle. Do they even think that it is an issue? A lot of our patients that come in, since they are not technically seen as sick yet, tend to overlook the problem. Changes are not being made as a family. As I was mentioning before, the entire family needs to be on board for these changes to be made. Another obstacle is working families with busy schedules. Do the parents have time to help assist the child in making these changes? And split homes is another concern and issue that we see — the family or the parents might be on board, but if they spend a lot of time with the grandparents, it might alter their new healthy ways of life. And then the last barrier is the "health halo". This is a concept that refers to people seeing a food as healthy, so they feel they can eat more of it. A common example of this is organic snacks, such as organic cookies. Because they are organic cookies, they think they can eat more, so they just tend to eat more calories.

If possible, after you obtain the height and weight, calculate the BMI and plot it on the two- to 20-year-old growth chart from the Centers for Disease Control. If this is not possible, then maybe encourage the family to discuss this with their primary care physician at their next visit. But during your exam, there are lots of things that you can discuss with the family on healthy ways of life. Try implementing some of these into your dental visit. It is very easy for you to mention something such as, "I'm looking forward to my lunch today. My plate is going to have so many colors on it! What's your favorite color of food?" And another example could be, "I was at the store the other day and I picked up a new fruit. I tried a passion fruit. Have you ever had that before?"

When discussing the BMI with patients, it is important to explain what BMI is and why it is used. We use BMI as a common measure for understanding where the child falls within the normal healthy range for age and gender. Children that fall above the 85th percentile are at risk for obesity, and children that fall above the 95th percentile are classified as obese. Use these growth charts as a guide, and never compare a child to another child. Just explain that the 50th percentile is what we have found to be the healthiest range, and

we would love to have all children close to that range to decrease the risk of health-related concerns.

There are also some easy things to tell your families before they leave your appointment or check-up. Tell them to drink only water and low-fat milk, increase their fruits and vegetables by trying to make half their plate fruits and vegetables, make at least half of their grain whole grains, and then the main thing for that is to make sure the first word in the ingredients is *whole*. Increase activity to 60 minutes a day, making sure their heart rate is up and their heart is pumping. Decrease screen time — including computer, TV, texting, iPod and video games — to two hours or less a day. Also, tell them to brush their teeth regularly so the taste of food is better. A clean mouth always allows you to get the true taste of new foods. And plan ahead; when they are on the go, they will already have a plan set, and they know what their next meal will be or what their next snack might be.

These patients tend to see you more than any other doctor, so remember to lead by example. Provide healthy snacks or recipes in your waiting area. And we have a POWER monthly newsletter that we would gladly provide to you if you would like to give that out in your waiting area. Provide resources for other activities that they could be involved with within your area. Provide empathy, because change is definitely not that easy. Never assume that the family has already tried to make these changes. Assist the person in developing reasons for change, and assist the person in weighing the benefits of changing versus not changing.

We all need to work together to make the new generation the healthy generation. With the help of all healthcare professionals, we can make this happen. Let us fill in the gaps. Look for weight management programs throughout your community by contacting your local hospitals. And if you have any questions or would like more information, please feel free to contact me by email at Agarant@luhealth.org or you can call our office at 317-948-9088.

Critical Discussion and Commentary

Toothaches & Cavities Both Affect Children's Well-Being

More data support that there is significant morbidity associated with caries in children

By Joel Berg, DDS

Based on: Leal SC, Bronkhorst EM, et al. Untreated Cavitated Dentine Lesions: Impact on Children's Quality of Life. *Caries Res* 2012; 46 (March): 102–106.

Although we go to great lengths to explain the significant impact of having a cavity to parents, caregivers, legislators and research funding entities alike, there exists a paucity in available good data documenting the morbidity of dental caries in children. We spend time talking

about how many cavities children have but less often describe the effect of those caries lesions on the child's life — the true outcomes that have real impact on the children and their families. A recent study assessed the impact of dental caries prevalence and the effects of untreated cavitated caries lesions that have extended into the dentin on the quality of life of six- and seven-year-old children.

Nearly 600 school children were evaluated using the ICDAS index to identify the number and extent of their caries lesions. In addition, a method to determine the consequences of the caries lesions was documented via the so-called pufa index that has been previously described. If the child had a history of toothache or extraction, that fact was noted. A modification of a previously used index called Childhood Oral Health Impact Scale was employed to document the child's oral health quality of life. A multiple logistic regression analysis was used to explore potential relationships between the existence of dentin-affected caries lesions, the effects of those lesions in the form of a pufa score, history of extraction or toothaches and the oral health-related quality of life score. Three-fourths of children had cavitated caries lesions which extended into dentin. One-fourth of children — one-third of those with dentin caries lesions — had effects of those lesions that manifested beyond the teeth. One-fifth of the children reported toothaches, and nearly 10% had extractions performed. Merely having had a dentin located caries lesion doubled the odds of having a lower quality of life. Having had effects of those lesions beyond the teeth and/or having a toothache increased the risk of lowering the child's quality of life by six times.

This study provides exactly the kind of data we need to express the real consequence of having "cavities". Too often, society associates having a cavity as a nuisance and thereby writes it off as an inconsequential disease. We spend \$65 billion each year in the United States alone treating the effects of dental caries, yet we have little data to support the suffering of children (and adults) as a result of caries. We need many more studies such as this. Although there is much anecdote we believe regarding the effects of caries, hard data will bring improved funding and awareness.

Long-Term Healing Outcomes in Regenerative Endodontics Are Still a Mystery

Different cell types can occupy the pulp canal space following trauma and can affect the long-term prognosis for success

By Dennis J. McTigue, DDS, MS

Based on: Andreasen JO, Bakland LK. Pulp Regeneration After Non-Infected and Infected Necrosis, What Type of Tissue Do We Want? A Review. *Dent Traumatol* 2012; 28 (February): 13–18.

Much attention has been given to regenerative endodontic techniques which reportedly "revascularize" necrotic pulp tissue in immature teeth, leading to physiologic root maturation, and we have discussed a

number of related papers in *Critiques* over the past couple of years. We know that traditional apexification techniques using calcium hydroxide (CaOH₂) have lost favor because the procedure is lengthy, taking a year or longer, and the CaOH₂ weakens root dentin, leading to cervical root fractures.

But many questions remain about what is really happening in these regendo techniques. Are we truly replacing the pulp with tissue identical in structure and function, or are we actually "repairing" the pulp with other tissue — and if that is the case, how will that replacement tissue behave over the long term? Authors of a recent study have broached these questions in an interesting paper.

Their review assesses present knowledge about the nature of tissue growing into canal spaces in regenerative endodontic techniques and how that tissue will function in the long term. The authors note the optimal outcome of regendo techniques would be to grow pulp tissue in the canal that could deposit new hard tissue on canal walls and that could respond to noxious stimuli by producing tertiary dentin. That outcome would truly define "regeneration" of the structure and function of pulp tissue. Published data thus far, however, have not provided precise information confirming true regeneration of pulp tissue.

Based on current literature, the authors describe four healing scenarios according to tissues growing into root canals. The first is revascularization of the pulp with accelerated dentin formation leading to pulp canal obliteration (PCO). This usually occurs after luxation injuries with displacement in immature teeth and has a relatively good long-term prognosis. The second healing scenario is ingrowth of cementum and dentin. This has occurred in the coronal segment of root-fractured teeth, and the long-term prognosis is not known. Third, ingrowth of cementum, dentin and bone seems to occur when Hertwig's epithelial root sheath is damaged or when an avulsed tooth is improperly stored before replantation. Interestingly, the presence of bone inside the canal has been associated with internal ankylosis-related resorption and infraposition of the crown. Finally, ingrowth of bone and bone marrow has been observed, and the prognosis for long-term success in these cases is not good.

It is obvious we still have many questions about the healing and long-term prognosis of teeth undergoing regendo techniques. From the four healing scenarios described by the authors, it is clear that different cell populations can occupy the pulp spaces after trauma or transplantation and they can affect the long-term prognosis for success. Still, the advantages of physiologically repairing necrotic pulps in immature teeth seem to outweigh the disadvantages of traditional apexification with CaOH₂, and much more research in this exciting field is needed.

Do Not Rinse After Tooth Brushing

Rinsing with water reduces the benefit of brushing with fluoride toothpaste; "spit don't rinse" should be promoted

By Arthur J. Nowak, DMD

Based on: Pitts N, Duckworth RM, et al. Post-Brushing Rinsing for the Control of Dental Caries: Exploration of the Available Evidence to Establish What Advice We Should Give Our Patients. *Br Dent J* 2012; 212 (April 13): 315–320.

We know brushing two times a day with a fluoride containing dentifrice has shown a preventive factor of about 25% in children. We also know the amount of dentifrice should be regulated dependent on the child's age, that brushing should commence as soon as the first tooth erupts and should be supervised by an adult, and that two brushings per day are recommended with the final brushing before bedtime. What has not been well-promoted is post-brushing rinsing. What I have observed is brushing for a period of time, spitting out excess toothpaste and then rinsing with water. Does it not seem counterintuitive to spend the time brushing and making sure that the fluoride paste is brushed on to every surface and crevice and then proceeding to rinse the mouth and remove much of the fluoride from on and around the teeth? Why do we tell our patients not to drink any water for an hour after topical applications, but say nothing about rinsing after brushing? What evidence do we have not to rinse after brushing?

Authors of a recent study gathered and examined the literature with the aim to produce a consensus on post-brushing rinsing. The topic of fluoride retention after use of a fluoridated toothpaste was initially studied and reported by Duckworth in 1991. He showed a rapid drop in fluoride concentration over the first 30 minutes, then a slower decline. Rinsing after brushing affects retention of the fluoride and subsequent clinical efficacy. Four behaviors have been noted in post-brushing rinsing in real-life settings — rinsing with water from a cup or glass, sipping water directly from the tap, sipping from a cupped hand and conveying water to the mouth with a brush.

Observations and reports state rinsing is the norm and with water the most popular. Studies report caries increments are higher in subjects that rinse compared with those that do not rinse. An alternative method suggested is to brush with a fluoride containing paste for two minutes without expectorating, then sip water to make a slurry, then actively swish for one minute, then expectorate with no rinsing, eating or drinking for two hours. This would be an excellent method to recommend for the final brushing before bedtime. The AAPD guidelines on brushing with a fluoridated toothpaste states, "to maximize the beneficial effect of fluoride in toothpaste, rinsing should be kept to a minimum or eliminated altogether."

The group did not arrive at a consensus because of the lack of high-quality evidence (randomized controlled studies) on the topic but stated their statement should be considered as an expert opinion with strength of evidence from at least one meta-analysis. Some of the consensus opinions are rinsing with water reduces the benefit of brushing with fluoride

toothpaste; “spit don’t rinse” should be promoted; in children, brushing/rinsing should be supervised until confident that the child will not drink the rinse; and brushing should be done two times a day.

Are You Using Medications for Children Without FDA Approval?

Off-label is defined as the unauthorized use of a drug for a purpose other than approved by the U.S. Food and Drug Administration

By Paul O. Walker, DDS, MS

Based on: Smith MC, Williamson J, et al. Off-Label Use of Medications in Children Undergoing Sedation and Anesthesia. *Anesth Analg* 2012; March 26: epub ahead of print.

The phrase *off-label use of medications* can be confusing. It is defined as, “the unauthorized use of a drug for a purpose other than approved by the United States Food and Drug Administration [FDA].” In dentistry, fluoride varnishes and chlorhexidine are often used in an “off-label” manner. It appears the use of off-label medications is a common practice in pediatric medicine as well. The FDA established indications, dosing and age limitations for medications based upon evidence from clinical trials, often supported by pharmaceutical companies. However, about 80% of medications licensed for use in the United States have not been approved for use in children. It is for these reasons that a recent article grabbed my attention.

The study involved a review of drugs administered by anesthesiologists during anesthesia or for purposes of pain management. There were 106 medications regularly administered. Using the Thomson Micromedex® online database, the FDA labeling and indications for patients under 18 years of age were determined. The drugs were then categorized in three areas — not FDA labeled for use in any pediatric age group, FDA labeled for use in all pediatric age groups, and FDA labeled for use in limited age groups. The drugs that did not have FDA approval for use in pediatric patients were then further examined to determine the strength of the evidence and the strength of the recommendation for each indication.

The authors also looked at the rate of off-label drug use in patients under 18 years of age in operating rooms from July 1, 2010 to August 31, 2011. The authors reported that, of the 106 drugs identified as being available to anesthesiologists, 40 (38%) were FDA labeled for patients of all ages, 36 (24%) had no FDA indications for patients under 18 years of age and 30 (28%) were FDA labeled with age-specific limits. In all, 73% of the drugs were used in an off-label manner. Of these, many of the most commonly used drugs were pediatric patients; neostigmine, hydromorphone and dopamine were FDA labeled not for use in any pediatric age group.

The authors concluded that many drugs used for pediatric patients during anesthesia lacked FDA labeling for pediatric use. Needless to say, this article, although informative, was

quite sobering. The study did have a number of limitations — the investigators only reviewed medications available to and used by anesthesiologists, and other institutions or facilities may have other drugs available for use by anesthesiologists. In addition, the investigation did not review drug labeling in other countries, only those covered by the FDA.

While this article might seem to be critical of physicians, I am aware that many dentists involved with the oral health of children have never reviewed the manufacturer’s insert which details the FDA indications, age-dosing and toxicity.

Forget the Fluoride Rinsing & Get Back to the ABCs

School-based fluoride programs work best in high-risk populations

By Arthur J. Nowak, DMD

Based on: Divaris K, Rozier RG, King RS. Effectiveness of a School Based Fluoride Mouthrinse Program. *J Dent Res* 2012; 91 (March): 282–287.

School-based fluoride rinse programs were popular before communities were adding fluoride to their water systems and in rural communities without community water systems. In a recent report from the Centers for Disease Control, 73.9% of United States citizens (204+ million people) on community water systems are drinking fluoridated water, but 72 million citizens remain without fluoride from community water systems not adjusted. Daily fluoride supplements have lost their popularity because of the need for prescriptions and compliance issues. A 2003 meta-analysis reported a 26% reduction in caries in permanent teeth and children enrolled in school-based fluoride rinse programs.

Schools have been the venue for many health and social programs because of a captive audience from K–12 for nine to 10 months of the year. Teachers object to the amount of time required and the mess to clean up after rinsing. Costs vary depending on paid staff or volunteers to administer the program from \$0.52 to \$2.54 per child per year. Some reports question the cost benefits of the program. Presently, 35 states have active school fluoride rinse programs, mostly in non-fluoridated and high-risk communities. So, what new evidence is available on the use and effectiveness of school-based fluoride mouth-rinse programs?

The aim of a recent study was to estimate the caries preventive effects of school-based programs in North Carolina and secondly whether the effectiveness varied by school level caries risk indicators.

Researchers performed a secondary analysis 2003–2004 North Carolina Oral Health Survey that used clinical and parent information for children from first to fifth grades. Years of participation in rinse programs were calculated; caries in primary teeth was recorded upon examination after cleaning with a toothbrush, drying with compressed air and visualizing the

teeth aided by a light source. Community water fluoride status was determined, and the number of children in school lunch programs was included in the analysis as risk factors. Untreated primary teeth cavities in kindergarten children were used in the analysis to further determine risk status.

The results showed the mean caries rates in grades one through five was 4.1 surfaces on primary teeth and 0.7 surfaces on permanent teeth. Fluoride mouth rinse participation showed minor reductions in caries prevalence but was more pronounced in high-risk schools. The overall effectiveness of weekly rinse programs was weak and not significant, but in the high-risk groups the long-term effects were present even

though only 9% of the sample students had participated for four years of the rinse program. The authors felt that untreated decay in kindergarten children was a superior marker to identifying risk of children as compared to enrollment in free lunch programs.

Even though the findings overall lack significance, the authors feel, if compliance over the length of the program is improved, children identified as high risk would benefit from school fluoride rinse programs.

Maybe rinsing is not the best way to go. How about fluoride varnish applications instead? More research is needed.

reviews

Literature Reviews

🔑 What Kinds of Oral Appliances Best Manage Sleep Apnea?

Take Home Pearl:

In children, rapid maxillary expansion may be an effective therapy for obstructive sleep apnea.

Background: Obstructive sleep apnea (OSA) is defined by repeated apneic episodes due to upper airway obstruction. There is also an associated reduction in oxygen saturation levels, as well as breathing disturbances and snoring due to redundant tissue impeding air flow. The current gold standard for assessment is laboratory-based polysomnography, which can be expensive and is very technique-sensitive in terms of interpretation. Other common therapies for OSA include weight loss, alcohol avoidance, changes in sleeping habits and positions, oral appliances, and continuous positive airway pressure (CPAP). Finally, there is a range of surgical procedures that have been used to address OSA as well.

Objective: To discuss oral appliance (OA) therapy for OSA.

Design: Review article.

Discussion: There is a wide range (>100 reported) of different OA designs. Most of these involve repositioning the tongue or mandible to allow for less airway obstruction. Interestingly, when dentists were surveyed previously, 58% could not identify common symptomatology associated with OSA. OAs have been demonstrated to have clinical efficacy rates similar to the CPAP but are often preferred due to being less invasive. Titratable OAs (those that can be adjusted with symptoms) were found to be superior to fixed OAs. Short-term side effects of OAs include hypersalivation, mucosal dryness, myofascial stiffness, and temporomandibular joint discomfort, but these are all largely transient. Long-term compliance with OAs has been demonstrated to be around 45%. In children, OAs have poorer compliance rates, and



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functional orthodontic devices such as rapid maxillary expanders have been shown to be effective management tools for OSA.

Conclusions: Consistent follow-up and management are needed to increase clinical success rates in OA therapy for OSA.

Reviewer's Comments: This is a really thorough review of the use of oral appliances. I was shocked that previous literature indicated 50% to 60% of dentists were not aware of signs and symptoms of OSA. I am sure this rate is higher in pediatrics, because pediatric sleep disturbances are so poorly understood.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Chen H, Lowe AA. Updates in Oral Appliance Therapy for Snoring and Obstructive Sleep Apnea. *Sleep Breath* 2012; May 6: epub ahead of print.

Drooling & Aspiration — A Deadly Combination

Take Home Pearl:

Posterior drooling is defined as escape of saliva through the faucial pillars.

Background: Patients with neurologic disease such as cerebral palsy (CP) can be at greater risk for pulmonary complications following chronic

aspiration of saliva, which can be aspirated during dysfunctional swallowing. Whereas many patients demonstrate anterior drooling that escapes the oral cavity, some also demonstrate posterior drooling, which can build up in the upper and lower airways. *Posterior drooling* is defined as the escape of saliva through the faucial pillars. In the late 1980s, radionuclide salivagrams

were used to assess passive saliva aspiration. In patients with CP, Parkinson disease, and amyotrophic lateral sclerosis, botulinum neurotoxin A (BOT) has been used to treat chronic uncontrolled drooling.

Objective: To assess saliva aspiration in patients following BOT administration using 2 case studies.



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Case Discussion: In both cases discussed, patients initially presented with excessive drooling that was significantly affecting quality of life. Salivagrams were used to establish pulmonary aspiration of saliva, and subsequently, injection of BOT was carried out bilaterally into the parotid and submandibular glands. The BOT was diluted with 0.9% saline solution to 100 units/2 mL. In both cases, reduction in saliva aspiration was

demonstrated, and in 1 case a reduction in the amount of saliva build-up in the lower esophagus was demonstrated as well. In both cases, reduction of anterior and posterior drooling was associated with improved sleep habits in these patients.

Reviewer's Comments: BOT is an increasingly common treatment modality for CP patients. I really was not aware of the concept of anterior drooling versus posterior drooling until I read this

paper. Another key feature here is reduction in drooling may also affect progression of demineralized areas into full-blown cavitated carious lesions, and dentists need to be aware of these therapies and their impact on oral health.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Park HW, Lee WY, et al. Salivagram After Gland Injection of Botulinum Neurotoxin A in Patients With Cerebral Infarction and Cerebral Palsy. *PM&R* 2012; 4 (April): 312–216.

No Sleep for Child Means No Sleep for Mom



Acute & Chronic Illnesses

Take Home Pearl:

Forty percent of mothers of kids with cerebral palsy were classified as having poor sleep quality associated with their child's sleep disturbances.

Background: Cerebral palsy (CP), or static encephalopathy, has been demonstrated to affect up to 3% of live births in the developed world. Because the etiology of CP rests in brain injury, these children have demonstrated significantly higher rates of sleep disturbances/parasomnias. General intellectual disability has also been associated with higher rates of sleep disturbances, as have visual impairments, which may both be features of cerebral palsy. Sleep disturbances have been associated with pediatric behavioral aberrances. The sleep disturbances of a child have also been shown to impact the sleep patterns and mental and overall health of the family.

Objective: To assess associations between child sleep, maternal sleep, and maternal mood within a cohort with CP.

Participants/Methods: Mothers of children with CP were asked to complete a questionnaire that included demographics, sleep-quality indices, depression components, and child sleep habits. Other generalized data included history of prematurity, comorbid epilepsy, visual impairments, and reflux. Cognitive impairment was also noted for children.

Results: Data were collected from 40 children-parent dyads and 102 controls. Children were between the ages of 4 and 12 years. Within the cohort, 35% of children had quadriplegic CP. The CP children had significantly worse sleep disturbances, including more frequent night-waking and sleep anxiety. Many of the CP children were also identified with sleep-disordered breathing. Disturbances in child sleep were highly associated with disturbance in maternal sleep, which was also associated with higher rates of maternal depressive symptoms. In the CP group, 40% of mothers were classified as having poor sleep quality. Maternal sleep quality accounted for 50% of variance in maternal depression scores.

Conclusions: Sleep disturbances are more prevalent in the CP population and have profound impact on maternal functioning.

Reviewer's Comments: This is a real eye-opening study that demonstrates a childhood chronic illness really is a family illness. Studies have demonstrated repeatedly that parents of children with special health needs have poorer health themselves and are at astronomically higher risks for divorce, financial problems, and psychopathology. I always try to remember this when these families come late to appointments, as they are tackling a world of issues beyond the walls of my practice.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Wayte S, McCaughey E, et al. Sleep Problems in Children With Cerebral Palsy and Their Relationship With Maternal Sleep and Depression. *Acta Paediatr* 2012; 101 (June): 618–623.

Understanding What Is Going on in Saliva May Reveal More Than We Think



Cariology

Take Home Pearl:

Variation of salivary carbonic anhydrase isoenzyme VI activity and child's age are associated with dental caries in preschool children.

Background: We know that dental caries in children as well as in adults is the result of demineralization of enamel and dentin caused by acid production of plaque biofilms. This caries activity is mediated via the

saliva and its factors. Seldom do we describe the effects of saliva on caries prevention and on caries rate reduction. Similarly, we have very little data looking at the constituent components of saliva and their effects on caries in primary teeth specifically.

Objective: To look at a specific isoenzyme in saliva called carbonic anhydrase isoenzyme VI (CAVI) in preschool children with caries lesions and to examine the relationship between caries lesion presence and salivary CAVI activity, the flow rate of the

whole saliva of the child, and the pH of the child's plaque biofilm after a 20% sucrose challenge rinse.

Participants/Methods: 30 children aged between 4 and 6.5 years were divided into a caries-free group and a group that manifested caries lesions. Each child was examined, and all of the mentioned whole saliva factors as well as the CAVI level were calculated both before and after the 20% sucrose rinse. Various correlation analyses were then performed.

Results: Prior to the sucrose rinse, the children who had caries lesions had a higher CAVI level. After the sucrose rinse, there was no difference between the cavity present and cavity-free children as far as their CAVI levels. The pH dropped in both groups after the sucrose rinse, and the whole saliva flow rate increased in both groups after the sucrose rinse. Caries activity in older children was observed to be higher than in younger children.

Conclusions: Variation of salivary CAVI activity and child's age are associated with dental caries in preschool children.

Reviewer's Comments: CAVI activity in other studies that were performed with differing methodologies has shown that having caries lesions reduces the CAVI level, contrary to the present study. CAVI activity is associated with a protective effect on enamel. CAVI aids in the deposition of minerals and in the protection against further demineralization. In this respect, the results reported in the present study indicate that saliva's reaction to caries lesions is to provide enhanced protective factors. The response to a challenge brought on by a caries lesion is to immediately begin to repair that lesion. We know little about various elements

in saliva and their effect on the primary dentition. It would be interesting to take a look at very young children, including those who manifest early childhood caries versus those who do not, and to measure their respective salivary CAVI levels, along with other salivary factors that might be modulated or might be mitigated by such salivary constituent elements.

Reviewer: Joel Berg, DDS

Article Reviewed: Frassetto F, Parisotto TM, et al. Relationship Among Salivary Carbonic Anhydrase VI Activity and Flow Rate, Biofilm pH and Caries in Primary Dentition. *Caries Res* 2012; 46 (April 13): 194–200.

Child Abuse Is Not Associated With Later Obesity



Child Abuse & Neglect

Take Home Pearl:

There is no significant association between maltreatment and a higher body mass index.

Background: Child maltreatment has been shown to have long-ranging implications for the child's overall well-being and development. Chronic health problems, behavioral disturbances, and educational setbacks are all common features of the maltreated child. No literature has reported on whether overweight status may be affected by a history of maltreatment.

Objective: To assess the prevalence of body mass index (BMI) in a population of maltreated youth and controls.

Participants/Methods: Subjects were studied from the files of the

Los Angeles County Department of Children and Family Services. BMI was measured, with weight being measured 3 times to ensure accuracy. Three groups were created: normal weight, overweight/obese (>85% BMI), and obese.

Results: Data were collected from 303 maltreated children and 151 controls. The maltreated group was broken down into neglect (77%), emotional abuse (51%), physical abuse (51%), and sexual abuse (21%). Children may have experienced >1 form of maltreatment. A significantly higher number of the maltreated group had BMIs >85%; however, there was no significant association between maltreatment and a higher BMI. Females who were physically abused and/or sexually abused had lower BMIs.

Conclusions: Maltreatment was not associated with higher BMIs in children.

Reviewer's Comments: As I read this, my thought is that we really needed to understand whether these maltreated children had any underlying psychological issues, because that might be more prevalent as a barrier to higher BMI. These children may have issues with diet after having been maltreated. It is a sobering article nonetheless and demonstrates that we really have limited long-term knowledge on what happens physiologically when a child is maltreated.

Reviewer: S. Thikkurissy, DDS, MS

Article Reviewed: Schneiderman JU, Mennen FE, et al. Overweight and Obesity Among Maltreated Young Adolescents. *Child Abuse Negl* 2012; May 7: epub ahead of print.

Behavior Guidance in Autistic Patients



Developmental Disabilities

Take Home Pearl:

The lack of social gaze in autism can lead to an inability to learn through observation.

Discussion: Learning by observing is a significant manner by which children interact with their environment. Children learn about consequences through observation. It has been demonstrated that children with autism demonstrate a sometimes profound deficiency in learning through observation. Children with autism may act simply out of repetition or non-

consequence-based imitation. Much of autistic children's learning methods involve one-on-one interaction with an adult in a very structured format to map out the concept of consequences. Potential methods that would benefit autistic patients include short statements with focused objectives rather than "story telling." A major challenge is instructing autistic children to imitate without being told or having verbal cues. This is due to the fact that many autistic children have poor social interaction/visual gaze, so they may not observe peer actions and rather may wait for a verbal cue to exercise imitation.

Reviewer's Comments: Yes, this is a "touchy-feely" paper for sure, but it has some real valid points, and it reinforces our use of tell-show-do, as well as management of patients with autism. Short, directed statements, not overloading the patients, are critical for compliance. The lack of social gaze means that autistic children often miss out on the opportunity to learn about consequence from watching others succeed/fail. Pediatric dentists need to make sure to frame the context of treatment for the child who has no concept of what is happening other than pain or discomfort. I found this

article fascinating in its recommended strategies, which mirror the AAPD behavior guidance guidelines.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Taylor BA, DeQuinzio JA. Observational Learning and Children

With Autism. *Behav Modif* 2012; May 7: epub ahead of print.

What Is That Smell?

Take Home Pearl:

Aromatherapy appears to be an effective intervention for postoperative nausea.

Background: Postoperative nausea is common following the use of anesthesia and surgery. While antiemetic medications can be utilized, they do not have reliably predictive effects.

Objective: To hypothesize that, when compared to inhaling a non-aromatic placebo, postoperative nausea would be significantly reduced with the use of 3 different aromas — essential oil of ginger; a blend of essential oils of ginger, spearmint, peppermint, and cardamom; or isopropyl alcohol.

Design: Randomized trial conducted at a single ambulatory surgery site.

Participants: The study included screening >1,100 patients, of which 303 were included. The eligibility criteria included adult patients able to provide informed consent with no history of coagulation problems or allergy to any of the aromatherapy agents.

Methods: The subjects rated the degree of nausea using a verbal descriptive scale with a range from 1 to 3. Patients with a nausea scale rating of 1 to 3 received a gauze pad saturated with a randomly selected aromatherapy agent and were instructed to inhale 3 times. The nausea scale was then repeated in 5 minutes.

Results: The change in nausea level scoring was significant for the blend of essential oils of ginger, spearmint, peppermint, and cardamom ($P < 0.001$) and for ginger essential oil ($P < 0.002$), but not for isopropyl alcohol ($P < 0.76$).



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In addition, the number of antiemetic medications requested by the patients was also significantly less with ginger oil ($P < 0.002$) and the blend of essential oils ($P < 0.001$).

Conclusions: The hypotheses that aromatherapy would be effective as a treatment for postoperative nausea was supported, and the authors believe that further research evaluating the effectiveness of aromatherapy is warranted.

Reviewer's Comments: Unfortunately, this study was conducted only on adults, but a similar study involving only children would be a valuable addition to the scientific literature.

Reviewer: Paul O. Walker, DDS, MS
Article Reviewed: Hunt R, Dienemann J, et al. Aromatherapy as Treatment for Postoperative Nausea: A Randomized Trial. *Anesth Analg* 2012; March 5: epub ahead of print.

General Anesthesia Is Safe for Healthy Children

Take Home Pearl:

Increased mortality with general anesthesia was associated with ASA III or higher status as well as younger age.

Background: There has been a demonstrated higher perioperative mortality rate in children when compared to adults. This mortality is associated with younger age, particularly infants and neonates.

Objective: To assess incidence and etiology of perioperative- and anesthesia-related mortality in pediatric patients.

Design: Systematic review.

Methods: Literature searches were conducted using the keywords *cardiac arrest*, *mortality*, and *anesthesia* in 4 major research databases. Mortality

was calculated as number of deaths \times 10,000 per number of children anesthetized. Mortality triggers were categorized as surgery related, disease related, and anesthesia related.

Results: 20 articles were identified as meeting qualifications. Between 1961 and 2000, the mortality rate decreased from 0.2–2.9 to 0–0.7. Higher mortality rates (up to 3.3) were associated with studies from developing countries. Mortality rates overall were higher in the neonate/infant group. Increased mortality was associated with ASA III or higher and the surgery being classified as emergency surgery. The child's underlying disease was the major mortality trigger in all cases.

Conclusions: While the overall mortality rates associated with anesthesia are low, the severity of the child's disease is still a major contributing factor to mortality.

Reviewer's Comments: This is a good systematic review that demonstrates the overall safety of general anesthesia, particularly on healthy children, in developed nations for minor procedures, ie, most of our early childhood caries kids. It also underscores that our children with special healthcare needs are at greater risk for poor outcomes, so early attention to oral health is critical. The truth is that 6-month periodicity for recalls may not be adequate to stem the onset of dental problems in these patients, as it was the child's underlying disease that was the major mortality trigger in most cases.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Gonzalez LP, Pignatton W, et al. Anesthesia-Related Mortality in Pediatric Patients: A Systematic Review. *Clinics* (Sao Paulo) 2012; 67 (4): 381–387.



Hospital & Operating Room

Exposing Dental Students to Real-World Scenarios May Enhance Empathy

Take Home Pearl:

Although dental students see themselves as empathetic, exposure to real patients sharing their negative dental experiences was perceived as helping to improve their understanding of patient concerns.

Objective: To assess whether videos of actual patients, not trained actors, recounting their experiences of insensitivity, difficulty in accessing care, or treatment errors associated with dentists will enhance dental student empathy for their patients.

Design/Methods: The investigation had 3 components: a survey of dental student knowledge and attitudes about empathy; viewing of patient videos by dental students; and a post-video survey of the students as well as completion of the Jefferson Scale of Empathy, a validated instrument for measuring empathy in healthcare professionals. Nineteen videos were developed that included 3 HIV-positive patients, 5 patients on income assistance, 4 disabled, 6 working poor, and 1 middle-class patient who had been dismissed from a dental practice.

Results: A pre-intervention survey revealed that most students felt that they had a good understanding of empathy

and most considered themselves empathetic. After viewing the videos, engaging in discussion about the videos, and performing a reflective writing exercise, 84% of second-year students and 73% of third-year students stated that these exercises enhanced their commitment to professionalism. Scores on the Jefferson Scale of Empathy were statistically higher for second-year students than third-year students. The authors speculated that the increasing technical demand placed upon upper-year students to complete clinical requirements might play a role in the score differences between second- and third-year students. The authors have added videos to the curriculum of their management course at the University of Western Ontario.

Conclusions: Although dental students see themselves as empathetic, exposure to real patients sharing their negative dental experiences was perceived as helping to improve their understanding of patient concerns.

Reviewer's Comments: To be able to effectively utilize the knowledge and skills we teach requires that students develop the ability to communicate effectively and demonstrate empathy for their patients. Various techniques have been employed to attempt to provide situations where dental students can develop empathy with their patients

that include patient simulations using trained actors. In the tertiary care hospital where I teach and practice, we focus on family-centered care. For our pediatric dentistry graduate students and GP residents, it is common for them to be overwhelmed by the complexity of medical conditions and the extent of the dental disease with which they are confronted. Consequently, it might be difficult to be empathetic with families and children dealing with significant dental disease superimposed on life-threatening medical conditions, when most of our residents have no children of their own and cannot imagine the stresses of parenting, particularly under the extreme conditions we regularly encounter. Videos of families recounting the barriers to care that they have encountered may be one way to improve young dentists' compassion for and understanding of the families they treat. That heightened empathy may enhance the care they provide for families and also enhance the residents' personal satisfaction and engagement with their work lives.

Reviewer: Michael J. Casas, DDS, MSc, FRCD(C)

Article Reviewed: Schwartz B, Bohay R. Can Patients Help Teach Professionalism and Empathy to Dental Students? Adding Patient Videos to a Lecture Course. *J Dent Educ* 2012; 76 (February): 174-184.

What Is the Best Method to Correct Post-Ortho White Spot Lesions?

Take Home Pearl:

While treatment with fluoride is beneficial, enamel microabrasion remains the best way to resolve post-orthodontic demineralized scarring.

Background: While several treatment methods are touted, there are few comparative studies looking at the best way to manage post-orthodontic treatment scarring.

Objective: To compare 4 methods to treat enamel scarring after orthodontic treatment.

Design: Prospective, randomized, controlled clinical trial.

Participants/Methods: 80 patients who had enamel scarring after

orthodontics were divided into 4 groups of 20 each. Group 1 brushed with fluoridated toothpaste; group 2 used 20 mL of neutral 0.025% sodium fluoride rinse; group 3 used casein phosphopeptide-amorphous calcium phosphate as a tooth mousse twice daily in addition to a fluoride toothpaste; and group 4 underwent microabrasion treatment using a mixture of 18% hydrochloric acid. Photos of pre- and post-treatment were analyzed to determine the percent improvement in scarring.

Results: The percent success for groups 1, 2, 3, and 4 was 45%, 48%, 58%, and 97%, respectively.

Conclusions: Microabrasion is the best method for the cosmetic treatment of these post-orthodontic demineralized white spot lesions.

Reviewer's Comments: While the results of this study are not surprising in that the enamel microabrasion technique was superior to the therapeutic agents utilized, I was pleased to see fluoride and casein phosphopeptide-amorphous calcium phosphate mousse both provided significant improvement for the scarring. This study was produced from the lead author's PhD thesis project. Its prospective, randomized, and controlled clinical trial nature strengthens the nature of the results. It might have been interesting to see the results if bleaching had been added to the prescribed treatment, but that will have to wait for another study.

Reviewer: Jeffrey A. Dean, DDS

Article Reviewed: Akin M, Basciftci FA. Can White Spot Lesions Be Treated Effectively? *Angle Orthod* 2012; February 23: epub ahead of print.

Exposure to Dental X-Rays May Increase the Risk for Meningioma



Take Home Pearl:

Children exposed to ionizing radiation are at greater risk for meningioma than if exposed as adults.

Background: Guidelines for the use of dental radiographs were developed in collaboration with multiple professional dental organizations with the goal of minimizing exposure to ionizing radiation and maximizing the ability to diagnosis dental diseases.

Objective: To assess the historical exposure to dental radiographs and determine if this exposure increases a person's risk for a common brain tumor known as meningioma.

Design: Case-control study with controls matched for age, sex, and geographic location.

Participants/Methods: Subjects ranged in age between 20 and 79 years, and included 1,433 cases previously diagnosed with meningioma and

1,350 controls. All subjects were asked to recall the type of dental care they had in the past and the type and frequency of dental radiographs they were exposed to over their lifetimes. The authors also documented any occurrence and timing of therapeutic radiation treatment. Statistical analysis was used to assess the risk of meningiomas with each covariate. Logistic regression was used to determine the odds of meningioma being associated with other risk factors.

Results: The percentage of cases and controls having bitewings during each age range was similar, but cases had 2 times more bitewings over their lifetimes than controls. Panoramic radiographs were more commonly made in adults than in children or adolescents. There was an almost 5-fold increased risk of meningioma in children screened with a panoramic radiograph before the age of 10 years. Limitations of the study included recall bias of radiographs made over a subject's lifetime and changes in standard

exposures used for bitewing and other radiographs today compared to 60 years ago.

Conclusions: In this study, exposure to dental x-rays in the past appears to increase an individual's risk for intracranial meningioma.

Reviewer's Comments: One additional limitation is that there is a possibility that 2% to 4% of the control subjects could have had an undiagnosed meningioma. This was not addressed, and it is not known what effect this might have had. The study should remind all of us to follow the radiographic guidelines and to limit exposures to all of our patients to that which is as low as reasonably achievable and provides us with the ability to accurately diagnose disease in a timely way.

Reviewer: Rebecca L. Slayton, DDS, PhD

Article Reviewed: Claus EB, Calvo-coressi L, et al. Dental X-Rays and Risk of Meningioma. *Cancer* 2012; April 10 : epub ahead of print.

Cri-du-Chat Syndrome Requires Early Intervention



Take Home Pearl:

Early recognition and treatment with rehabilitative and educational interventions are essential for positive long-term outcomes in patients with cri-du-chat syndrome.

Background: The cri-du-chat syndrome (CdCS) is a genetic disease resulting from a deletion of variable size occurring on the short arm of chromosome 5(p).

Objective: To perform a retrospective analysis of the orofacial features and common oral pathology observed in individuals diagnosed with CdCS.

Design/Methods: The study sample consisted of 33 patients diagnosed clinically and confirmed by means of a karyotype test with CdCS between 2008 and 2009. Information was obtained from the patients' medical records to include birth weight, gestation period, major and minor malformations, and other medical problems. Oral health information was gathered from questionnaires completed by the

parents. A thorough clinical examination was completed. Photographic examination and radiographic analysis were performed for compliant patients. Characteristics were categorized according to severity and included level of disability, degree of mental retardation, microcephaly, hypotonia, decay and periodontal disease, and behavior. Univariate analysis of the results consisted of a descriptive analysis of the variables, and the Chi-square test was used to investigate the relationship between parameters.

Results: Of 33 patients, 13 males (40%) and 20 females (60%), the mean age was 14.65 years with a degree of disability of 73%. All the patients had average birth weight, gestational age, and were mentally handicapped with the majority rated moderate to severe. Preliminary diagnosis was established in 94% of the sample from a monotone weak cat-like cry during infancy. Psychomotor developmental delay occurred in all the patients, who exhibited altered suction (72%), generalized muscle hypotonia (88%), dysphagia (52%), and gastroesophageal reflux (66%). Other general

characteristics included hypertelorism (94%), epicanthal folds (94%), short philtrum (97%), low set ears (78%), and facial asymmetry (69%). Orally, the patients showed mandibular retrognathism (91%), high palate (55%), anterior open bite (63%), hypotonic perioral muscles (97%), and dental anomalies (57%) to include oral habits with self abuse and increased drooling. Socially, 78% of the patients were euphoric with cheerful personalities, yet 72% were hyperactive, 66% were aggressive, and all displayed continuous uncontrolled movements. Due to these factors, 90% of these patients required dental treatment using deep sedation or general anesthesia.

Conclusions: Familiarity with the orofacial pathology along with the developmental and behavioral disorders associated with CdCS will help professionals determine the best treatment approach and management for these patients' specific oral needs.

Reviewer's Comments: This is a good retrospective study with a very good sample size for this particular syndrome. For the most part, the

findings were consistent with previous similar studies. A limitation was that not all examinations and questionnaires were fully completed for all patients, further reducing comparisons.

Also, much of the early dental-related information was based on parental recollection, and there was no discussion regarding standardization of the examiners.

Reviewer: Erwin G. Turner, DMD
Article Reviewed: Rodríguez-Caballero A, Torres-Lagares D, et al. Assessment of Orofacial Characteristics and Oral Pathology Associated With Cri-Du-Chat Syndrome. *Oral Dis* 2012; 18 (March): 191–197.

Sleep Apnea in a Special Needs Population Is a Threat to Daily Function



Take Home Pearl:

The obstructive sleep apnea rate in a CHARGE syndrome cohort was 65% compared to 1% to 4% in the general pediatric population.

Background: CHARGE syndrome is associated with choanal atresia, colobomas, cranial nerve abnormalities, and temporal bone abnormalities. The overall incidence of CHARGE syndrome is 1 in 8,500 births, making it a common genetic disorder. It has been noted previously that close to 60% of children with CHARGE have sleep disturbances, including apneic episodes. Some studies have suggested an obstructive sleep apnea (OSA) prevalence in CHARGE patients as high as 50% compared to 1% to 4% in the general pediatric population. OSA and other sleep disturbances have been

shown to gradually affect behavior and social interactions of children.

Objective: To assess the prevalence and symptomatology of OSA in a CHARGE population.

Participants/Methods: Subjects were aged 0 to 14 years with a confirmed CHARGE diagnosis. Data collected included demographics, history of previous sleep surveys, Pediatric Sleep Questionnaire, and OSAS Quality of Life Survey.

Results: Data were collected from 51 children, with a mean age of 6 years. Of the total cohort, 65% had a diagnosis of OSA, and 10 children were being treated with continuous positive air pressure (CPAP). The CHARGE children exceeded the sleep survey threshold for OSA by double. Even following treatment (tonsillectomy and adenoidectomy), 21% of CHARGE patients still had OSA-associated

symptoms. Only 2 of the cohort were classified as overweight.

Conclusions: In children with CHARGE syndrome, OSA is a significant threat to daily function.

Reviewer's Comments: I have been interested in how sleep disturbances affect the special needs population, and I think it is an underrated and misunderstood phenomenon. Children with special needs have been overwhelmingly shown to have sleep disturbances, and, in the case of CHARGE syndrome patients, OSA is a significant detractor from quality of life. Even after CPAP or ENT surgery, 20% of patients still had apneic episodes (note that these patients were overwhelmingly non-obese).

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Trider CL, Corsten G, et al. Understanding Obstructive Sleep Apnea in Children With CHARGE Syndrome. *Int J Pediatr Otorhinolaryngol* 2012; April 25: epub ahead of print.

Keep That Portable X-Ray Unit Battery Charged



Take Home Pearl:

Not all hand-held x-ray devices come with backscatter shields.

Background: Hand-held x-ray equipment is designed specifically to be hand-held during operation. It was first developed in the early 1990s for military dentistry. Since their first use, they have also been used in areas such as nursing homes, forensic investigations, and temporary healthcare clinics. Because the operator is in direct contact with the radiation-emitting source, concerns have been raised about backscatter.

Objective: To assess the effect of battery charge on tube voltage in different hand-held systems.

Methods: Current Korean Food and Drug Administration regulators indicate

that tube voltage should be within 10% of indicated kV values at all times. Tube voltage was measured with digital sensors and 7 different portable systems. Exposure time was measured with differing battery levels all for adult mandibular molar periapical radiographs. The tube voltage was measured for 3 consecutive exposures.

Results: For all units, there was a reduction in tube voltage (as measured in kV). Tube voltage deviation percentage of the kV ranged from 2.5% to 10.0% of indicated kV range. Not all models came with a backscatter shield.

Conclusions: Portable x-ray equipment efficacy is affected by amount of battery charge.

Reviewer's Comments: This article is significant in that the prevalence of hand-held units (such as the NOMAD

Pro) is increasing dramatically in dentistry. Recently, an FDA recall alerted us to the fact that there is not a substantial body of literature on these devices, and radiographic precautions need to constantly be followed. The premise of this article, namely effect of battery charge on tube voltage, is not something I had really considered — I just always try to have a charged battery on hand but do not change out unless it is low. Maybe I should be changing them out at the beginning of every procedure.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Kim EK. Effect of the Amount of Battery Charge on Tube Voltage in Different Hand-Held Dental X-Ray Systems. *Imaging Sci Dent* 2012; 42 (March): 1–4.

Does Coffee for Mom Mean a Restless Sleep for Baby?

Take Home Pearl:

Caffeine consumption during pregnancy and by nursing mothers seems not to have consequences on sleep of infants at the age of 3 months.

Background: A child's sleep habits are often still in flux during early infancy, with night waking being a common occurrence. There have been associations between more frequent night waking in children and male gender, daytime napping, bed sharing, and poverty. Caffeine is a central nervous system stimulant commonly used by adults. Caffeine has been shown to cross the placental barrier; furthermore, the fetus has been shown to have a poor ability to metabolize caffeine.

Objective: To assess caffeine consumption by mothers and infant sleep/waking patterns.

Methods: A birth cohort was assessed for heavy maternal caffeine consumption (defined as >300 mg/day). Other assessments included smoking, marital status, family monthly income, and maternal depression.

Results: Data were collected from 885 infants. Caffeine consumption decreased during gestation, and at 3 months post-partum the mean caffeine consumption was 144 mg/day. Heavy consumption was reported by 20% of mothers but also decreased with gestation. Night waking was more common in children where mothers used alcohol during pregnancy. Infants exposed to higher rates of prenatal caffeine had a 9% higher rate of night waking.

Conclusions: Caffeine consumption during pregnancy and by nursing mothers seems not to have consequences on sleep of infants at the age of 3 months.

Reviewer's Comments: The results were not what I expected, but this does make sense. There are a constellation of family-based variables that may contribute to waking among children, and maternal caffeine alone is not the "silver bullet," although this study does implicate it with some degree of causality. The sleep environment that the child is in also plays a highly significant role in whether the child develops good sleeping habits.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Santos IS, Matijasevich A, Domingues MR. Maternal Caffeine Consumption and Infant Nighttime Waking: Prospective Cohort Study. *Pediatrics* 2012; 129 (May): 860–868.

Defining the Role of a Pain Clinic in Pediatrics

Take Home Pearl:

Common methods used to distract children from painful procedures include cartoons and bubbles.

Background: Pain in childhood has been associated with short- and long-term morbidity. It has been shown to potentially restructure pain pathways, resulting in altered pain thresholds, which can impact both patient and parent treatment compliance. Procedure-related pain is a significant cause of pain in childhood, and this may include inadequate periprocedural analgesia and postoperative pain recognition and management.

Objective: To evaluate a procedural pain service's role in pain management and education.

Design/Methods: This study retrospectively evaluated the activities of the Procedural Pain Service of the University of Padua Department of Pediatrics over a 5-year period from 2006 to 2010. Data were collected on patients, procedures, sedatives, and analgesics used.

Results: Over a 1,272-day period, 3,815 patients were treated, with a mean of 8.5 sedations/pain-associated management procedures daily. The median age of patients treated was 6 years. Over 40% of patients had >1 procedure associated with the pain clinic. The most common procedures performed were lumbar puncture and bone marrow aspiration. Patients were distracted during sedations with the use of cartoons in 40% of sedations and bubbles in 30% of sedations. The most common adverse events associated with sedations included desaturation,

laryngospasm, and vomiting. Parents and children were very satisfied with their pain clinic procedures.

Conclusions: This Italian model functions on 2 integrated levels, and it can be considered generally applicable as a solution for pain management.

Reviewer's Comments: The pain clinic described here is really a sedation clinic in the United States. Common behavior guidance techniques such as use of distraction are described and shown (as we know) to be effective for children. The adverse effects match those reported in the dental literature.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Po C, Agosto C, et al. Procedural Pain in Children: Education and Management. The Approach of an Italian Pediatric Pain Center. *Eur J Pediatr* 2012; March 7: epub ahead of print.

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E-quiz code: 31885N

1. Increasing age lowers caries risk.
Practice: T F **Answer Submitted: T F**
2. Schwartz et al found that exposing dental students to videos of real patients sharing their negative dental experiences did not increase empathy toward patient concerns.
Practice: T F **Answer Submitted: T F**
3. Microabrasion is the best method for the cosmetic treatment of post-orthodontic demineralized white spot lesions.
Practice: T F **Answer Submitted: T F**
4. Ankylosis and infraposition of the crown can occur when bone invades the pulp canal space.
Practice: T F **Answer Submitted: T F**
5. Pitts et al found that rinsing after tooth brushing reduces the clinical efficacy of the fluoride effect.
Practice: T F **Answer Submitted: T F**
6. In the study by Claus et al, the risk for meningioma was greater in adults because they were more likely to have been exposed to panoramic radiographs.
Practice: T F **Answer Submitted: T F**
7. The study by Rodriguez-Caballero et al found that 94% of patients with cri-du-chat syndrome were diagnosed in infancy from a monotone weak cat-like cry.
Practice: T F **Answer Submitted: T F**
8. According to Hunt et al, aromatherapy agents are ineffective as a treatment for postoperative nausea.
Practice: T F **Answer Submitted: T F**
9. Leal et al found that children with toothaches or extractions had 6 times the likelihood of reduced quality of life.
Practice: T F **Answer Submitted: T F**
10. Many drugs used for pediatric patients during anesthesia lack FDA labeling for pediatric use.
Practice: T F **Answer Submitted: T F**
11. School-based fluoride rinse programs are very effective and cost effective.
Practice: T F **Answer Submitted: T F**
12. Trider et al found that treatments were 100% effective in reducing obstructive sleep apnea in the CHARGE syndrome population.
Practice: T F **Answer Submitted: T F**
13. Autistic children are very good at picking up on non-verbal behavior cues.
Practice: T F **Answer Submitted: T F**
14. According to Santos et al, infants exposed to higher rates of prenatal caffeine have higher nighttime waking.
Practice: T F **Answer Submitted: T F**
15. Oral appliances have been demonstrated to have clinical efficacy rates similar to continuous positive airway pressure, but are often preferred due to being less invasive.
Practice: T F **Answer Submitted: T F**
16. Portable x-ray equipment efficacy is affected by amount of battery charge.
Practice: T F **Answer Submitted: T F**
17. Park et al found a demonstrated association between reduced drooling and improved sleep habits in cerebral palsy patients.
Practice: T F **Answer Submitted: T F**
18. Maternal sleep disturbances have no association with maternal depression.
Practice: T F **Answer Submitted: T F**
19. In an Italian study by Po et al, the authors found that the most common adverse event associated with sedation in their pain clinic was oxygen desaturation.
Practice: T F **Answer Submitted: T F**
20. Gonzalez et al found that overall mortality rates associated with anesthesia are low, but the main contributing factor is the child's underlying disease and not the anesthesia itself.
Practice: T F **Answer Submitted: T F**

1. **T** High concentrations of fluoride found in 2,500 ppm fluoride toothpaste can be “stopped” by bacteria.
2. **T** The revascularization technique is effective in limiting the inflammatory external root resorption in the replanted incisor.
3. **F** Occupational exposure doses for handheld x-ray systems are significantly more than for wall-mounted systems.
4. **F** Systemic antibiotics are no longer indicated in the treatment of avulsed permanent teeth.
5. **T** Prenatal counseling of high-risk mothers may reduce the risk for future oral disease in their offspring.
6. **F** Children whose racial background is non-Hispanic white are at increased risk for obesity and early tooth eruption.
7. **T** The recent retrospective study by Elangovan et al found that >80% of patients who visit the emergency department for herpetic gingivostomatitis are treated and routinely discharged, with 15% requiring hospitalization.
8. **F** Both race and socioeconomic status have an effect on the diagnosis and reporting of child abuse.
9. **F** Loupes are absolutely necessary for accurate occlusal caries lesion detection.
10. **F** Under the new immunization schedule, only girls should receive the human papillomavirus quadrivalent vaccine.
11. **T** The combined application of iodine followed by fluoride varnish reduces new tooth decay by 31% overall, according to a recent study.
12. **F** It is estimated that nearly 90% of parents receive evidence-based recommendations on pacifier usage.
13. **F** Patients who are treated with the Ankaferd blood stopper (ABS) for hemostasis control have significantly more postoperative infections than those not treated with the ABS.
14. **T** In a population of cerebral palsy patients, the primary injection site for botulinum toxin is lower limbs.
15. **F** Adequate hemostasis can be achieved through routine transfusions in patients who are taking multiple antiplatelet agents.
16. **F** Males and females are equally diagnosed with attention deficit/hyperactivity disorder.
17. **F** The reported bioavailability of oral midazolam is close to 100%.
18. **T** Younger children with earlier onset of epilepsy have worse behavior issues than do children with a later onset.
19. **T** Unmodified rosin exposure may sensitize patients to all forms of rosin, including modified rosin.
20. **T** There are no differences in postoperative pain, amount of rescue analgesia, or oral intake of food between patients who receive intraoperative dexamethasone and those who do not.

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