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

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Vital Topic

Strategies to Effectively Manage Obsessive-Compulsive Disorder in the Pediatric Population

Typically we see OCD developing in children between the ages of six and 12; as OCD begins in the early ages, it is typically seen in repetitive behavior such as tapping, touching, walking, and handwashing

By Jerome Bubrick, PhD

Obsessive-compulsive disorder (OCD) is an anxiety disorder that affects hundreds of millions of people worldwide. In fact, OCD affects one in 40 adults and one in 200 school-age children in this country alone. It does not discriminate between ethnicity or gender, and the most common age of onset is between six and 12 years of age. It is considered a complex neuropsychiatric condition that waxes and wanes over time but tends to get worse when the child is stressed out. Obsessions are defined as unwanted, intrusive, forceful thoughts, images, or sounds that cause anxiety or distress. They cannot be suppressed or rejected. Compulsions are the motor or mental acts that people feel compelled to do in order to relieve the anxiety caused by the obsessions.

It is possible, but very rare, to have pure obsessional OCD, that is, obsessions only without compulsions. It is much more common, however, for people to think they have pure obsessional OCD, or to have been misdiagnosed with it, but upon further examination we are able to identify certain behaviors or actions as compulsions. Diagnostic criteria indicate the presence of obsessions and/or compulsions lasting at least one hour per day and causing significant impairment in life. Evidence-based treatments include cognitive behavioral therapy, specifically cognitive therapy and exposure with response prevention, which focus on giving the child more adaptive and healthy coping skills to decrease the impairments caused

by their symptoms, and pharmacological treatments, which decrease the frequency and intensity of the obsessions.

To some degree, everyone likes to think they have a little OCD. People say things like, "Don't mind me. It's just my OCD," when doing something they think appears to be out of the ordinary or excessive. The truth is, we all have bits and pieces of OCD, in the context of a threat-detection process. With varying degrees of intensity and effort, we all monitor for threat at all times so that we can protect ourselves from danger or potential harm. For the most part, we have to allow ourselves a moder-

ate level of threat detection so we can still have fulfilling, successful, and productive days. For example, in New York City in the wake of September 11th memorials, we were advised by the government to use caution in everyday life and to use the motto "If you see something, say something" if confronted by an unknown or suspicious situation. And for the most part, that is how we function in life.

There are some people, though, who function with differing levels of threat detection. Some people follow a low threat detection and avoidance model and are not as concerned with potential consequences. For example, someone may not be as fearful about germs, thus chooses to not brush their teeth, shower, or wash their hands, and therefore does not seem too worried about short-term or long-term effects, but

The gold standard of treatment for OCD is cognitive and behavioral therapy with specific techniques focusing on cognitive therapy and exposure with response prevention.

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

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mainly to impaired social, academic, or professional functioning. Other people may engage in a higher threat detection and avoidance model and might be hyper-concerned about germs, which leads them to brushing their teeth, handwashing, and showering for excessive periods of time with great concern about short- and long-term health risks, but also have significant interference with social, academic, and professional functioning. People with OCD appear to have a lopsided dialogue about threat and consistently make errors by overestimating the severity or persistence of threat. This results in the child being so worried about the possibility of threat or harm that she cannot concentrate effectively or not be fully engaged in other functions like play, studying, work, etc. A frustrating component for the child is that he may know logically that brushing his teeth for 15 minutes is excessive, but emotionally feel safer because of the minute possibility that any lingering plaque could be catastrophic. In those moments, it is almost as if the brain is unable to say, "Relax, do not worry about it," and allow the child to be content with five minutes of brushing instead.

Typically we see OCD developing in children between the ages of six and 12, and it is rare for someone to develop it after the age of 25. The most common exception to that rule is women who develop postpartum symptoms. As OCD begins in the early ages, it is typically seen in repetitive behavior such as tapping, touching, walking, and handwashing behaviors. At these ages we are not seeing the effects of the threat detection dialogue, but instead children talk about needing to do the behaviors because they do not feel right inside or are trying to get what we often refer to as the just-right feeling. As the brain develops and allows for more threat-detection awareness and for more abstract thinking, we see more of the superstitious qualities to the behaviors. Magical thinking is a common characteristic of OCD and refers to the belief that one's thoughts or actions can have a direct role in the life or fate of someone else. You know, like "step on a crack, break your mother's back," or breaking a mirror, or your favorite number, 13. If you are ever in a New York City skyscraper, really examine the elevator buttons. Most of them go 10, 11, 12, 14. It is really quite interesting. It seems silly to think that in this day and age we avoid a number representing a floor because we actually think it represents danger, so we avoid it. This is exactly how OCD works, and why I stated earlier that to some degree we all have it.

Common pediatric symptoms of OCD include excessive fears with contamination or germs, fears of having bad luck or misfortune, fears of having done something violent or having sexually inappropriate thoughts or having done inappropriate actions, offending God, and having extreme difficulties with making decisions. Remember that obsessions are unwanted thoughts, and the child is stressed out with having them. This is especially important to remember with symptoms involving sexual or aggressive obsessions. The child is not a danger. Rather, the opposite; he greatly fears the danger will come because of the thought and goes out of his way to prevent it from happening. The most common compulsions in children involve excessive handwashing and general hygiene, checking locks, windows, doors, etc., ordering and arranging things, making lists, counting, tapping, touching, and seeking reassurance. These symptoms can greatly interfere with a child's ability to function across multiple settings. Having intrusive thoughts can significantly affect concentration, and often appear to others as possible signs of attention

deficit-hyperactivity disorder. Symptoms can also affect social, family, and work functioning as well. Children may have a hard time doing homework, often spending hours to complete it, while simultaneously warding off symptoms. They typically have increased anticipatory anxiety prior to entering a situation that may trigger their symptoms. For example, a child with excessive fears of having a cavity may experience heightened levels of anxiety up to a month or a week away from the dentist's appointment and may increase their brushing and avoidance of foods they may think are likely to cause cavities. I know some dentists out there are probably saying, "Where is the problem with this?" But keep in mind these are excessive worries and actions that can cause impairments in most demands of life, to the point where all he can think about in school or on a play date is the next time he can brush. The child may seek excessive reassurance from parents and/or the dentist about the quality of their brushing or about the overall cleanliness of their mouth. She may brush her teeth immediately after feeling "plaque in her mouth." Certainly we would expect very high levels of anxiety in the office, and it may result in the child's wanting to cancel or avoid the appointment and may be experiencing somatic symptoms while waiting, typically headaches and stomach aches.

The good news is the treatment we have for OCD is highly successful and actually motivates and invigorates the child and the family to fight it off. The gold standard of treatment for OCD is cognitive and behavioral therapy with specific techniques focusing on cognitive therapy and exposure with response prevention. We start treatment by externalizing the condition for the family and child, usually with the model of a bully. We explain there is a pretend bully living in the basal ganglia area of the brain that makes the child think and do things she does not want to. We set up a framework that allows the clinician, the family, and the child all to fight the bully. We help the parents learn to set limits with reassurances and how to help the child beat up the bully, thereby making the child stronger. The child learns how to recognize the maladaptive thought and threat-detection process, identify irrational thoughts, and teach them how to fix them to create more rational versions. For example, if the obsession says, "If there is any plaque on your teeth, you will get a cavity," then we help the child create a more rational version, which could be like, "Everyone has a little plaque all the time, even the dentist, so I can handle this. It is not that big of a deal." This process allows the child to be able to motivate to face other fears directly.

Exposure with response prevention has been proven scientifically as the most effective strategy for improving OCD symptoms, with up to 85% of people showing marked improvements within 12 sessions. It is a fancy way of saying that we systematically and slowly introduce the child to the fears caused by the obsessions without allowing them to engage in compulsions at all. This is effective because of the process of habituation. For example, if you jumped into a cool pool on a hot day, initially you would feel the temperature of the water, but if you stayed in the water for about five minutes, you would adapt and no longer feel it. The same is true for anxiety. We set up situations like having the child eat a sucking candy and wait progressively longer periods of time before brushing her teeth, maybe starting at five minutes and progressing up to an hour or two, and eventually to one designated brushing time of the day. We then have the

child practice this at home with the family until it causes little to no anxiety, and then moving on to the next symptom.

We simultaneously help the family and others cope effectively with reassurance-seeking behaviors. A child who seeks reassurance will be temporarily relieved of the anxiety, but will seek it repeatedly again when the anxiety resurfaces. The most effective strategy is to set limits with the number of times a reassurance is given, then saying to the child something like, "I know this is hard for you, but hold on to what I told you before and remember what you know." If appropriate, that person can reference the bully model and be part of the team that fights it off.

There is currently no cure for OCD, but we have a highly successful treatment for it, and we can give our children a toolbox of skills they can use over the course of their lifetime to more effectively cope with it.

Critical Discussion and Commentary

Unexpected Bleeding in the Operating Room – WHY?

Interactions with several drugs including valproic acid, ciprofloxacin, tetracycline, and griseofulvin have been associated with acquired von Willebrand disease

By Paul O. Walker, DDS, MS

Based on: Lison S, Dietrich W, Spannagl M. Unexpected Bleeding in the Operating Room: The Role of Acquired von Willebrand Disease. *Anesth Analg* 2012; 114 (January): 73-81.

Excessive bleeding in the operating room can be problematic. However, in most instances, if a patient had a bleeding disorder such as a Factor VIII or Factor IX deficiency, you would be aware of it through a thorough health history and be able to take proper prophylactic measures prior to surgery. But what if you were caught unaware of a bleeding disorder? Unexpected excessive bleeding in the operating room can certainly ruin your day.

In contrast to congenital von Willebrand disease, which is characterized by a pattern of inheritance and generally has a bleeding history from early childhood, acquired von Willebrand disease can occur in individuals without any family history of hemorrhagic diatheses. The estimated prevalence for inherited von Willebrand disease is 0.01% to 1.3%, and the estimated prevalence of acquired von Willebrand disease is 0.04% to 0.13%. It is seen equally in both males and females. Acquired von Willebrand disease is usually accompanied by a comorbidity.

This article discussed a specific case and then reviewed associated disorders, proposed pathophysiologic mechanisms, and available treatment options. The patient reported was a 46-year-old male who was hospitalized because of central spinal cord syndrome and progressive pain and acute dorsal

flexor weakness. His activated partial thromboplastin time was 47 seconds compared to the reference range of 25 to 42 seconds. Under normal circumstances, the estimated blood loss would be anticipated to be 12 to 93 mL for this procedure. However, this patient had an estimated blood loss of more than 200 mL. Due to a massive hematoma at the surgical site, re-exploration was performed at day nine and again at day 11. A reexamination of the patient's history revealed an increased oral mucosal bleeding tendency, which was treated with oral tranexamic acid rinsing. Postoperative laboratory testing revealed normal or close to normal results with the exception of various von Willebrand disease measurements. He was treated postoperatively with high-dose factor VIII and von Willebrand factors. Following the second intervention, no further bleeding episodes occurred.

In reviewing the literature on acquired von Willebrand disease, the authors noted that this condition occurred in association with a variety of underlying diseases including lymphoproliferative and myeloproliferative disorders, malignancies, and immunological disorders. In addition, it can be associated with several cardiovascular disorders, including aortic stenosis, mitral valve prolapse, or congenital ventricular or atrioseptal defects. Last, interactions with several drugs including valproic acid, ciprofloxacin, tetracycline, and griseofulvin have been described.

Hopefully none of us will ever have to deal with acquired von Willebrand disease. The prevalence is quite low, but the possibility exists. I had never heard of this disorder, but I was glad that I had an opportunity to read up on it.

Orthodontic Appointment Intervals: One Size Fits All...or Not

Individual variation, depending on pathology and appliance type, helps to dictate length of time between orthodontic appointments and can vary significantly from as short as one week to as long as 10 weeks

By Jeffrey A. Dean, DDS

Based on: Jerrold L, Naghavi N. Evidence-Based Considerations for Determining Appointment Intervals. *J Clin Orthod* 2011; 45 (July): 379-383.

Like most of you, I know full well that with the advances in orthodontic appliances and archwires, appointment intervals for my orthodontic patients do not need to be the old rigid every-four-weeks formula utilized back when stainless steel was the only material available. However, I do at times find myself somewhat guessing when I make a decision about when to have a particular patient return for their next visit. I take into consideration some rule of thumb thoughts that I personally have, but have never bothered to sit down and try to use any scientific evidence to make this clear for myself or my staff. So when I saw this article, it caught my interest. This was more of a review article than

anything, and therefore not a meta-analysis. However, I found the logical methodology they used in presenting it an easy read and very helpful to me in my clinical practice.

They start off by reviewing some noteworthy articles and referencing several different studies that have been published in the past. In particular, they utilized the 2008 American Association of Orthodontic Patient and Member Census Study that showed that roughly 41% of respondents preferred appointments every six weeks, with 24% preferring appointment intervals of seven to eight weeks. Appointment intervals of four weeks were preferred by only 19% of the respondents. This was a little surprising to me, as I would have thought that the four-week interval time period would have been a little more common. The authors then discuss periodontal considerations, root resorption, decalcification, and biomaterials in order to present their nine evidence-based recommendations for scheduling orthodontic appointments, with the caveat that one size does not fit all. They go on to suggest that appropriate intervals can be as long as one to two weeks or as long as eight to 10 weeks.

The nine recommendations that they have are categorized as following:

- 1) Patient age. They suggest that adults should be seen at shorter intervals than children, four weeks versus six to eight weeks, because of slower bone response to tooth movement and higher risk of periodontal disease.
- 2) Type of archwires and forced delivery system. As I mentioned earlier, they used the evidence-based literature to point out that nickel-titanium archwires can be left in for considerably longer periods of time, and newer forced delivery systems, for example newer sliding mechanics, can make these appointments anywhere from six weeks to eight to 10 weeks.
- 3) Periodontal status. Obviously patients with poor oral hygiene and periodontal disease should be scheduled at intervals of four weeks or less.
- 4) Extraction versus nonextraction. Jerrold and Naghavi suggest that nonextraction cases can have longer appointment intervals of six to eight weeks, while patients undergoing extraction treatment should be scheduled back every four to six weeks, unless straightforward sliding mechanics are being utilized.
- 5) Surgical and impacted cases. Four-week intervals are recommended in these cases because of the need to check forces for eruptive mechanics, periodontal sequelae, and root resorption.
- 6) Compliance versus noncompliance mechanics. Not too surprisingly, the authors suggest that compliance-dependent appliances need to be seen at shorter intervals, that is, four weeks, and patients with noncompliant appliances might be able to be seen with intervals as long as eight weeks. In addition, they add that patients with rapid maxillary expansion appliances need to be seen at one- to two-week intervals.
- 7) Decalcification and white spot lesions. Patients with poor oral hygiene must be seen at least at every-four-week intervals without exception.

8) Root resorption. Patients with mild root resorption may be seen every six weeks. However, those with more severe resorption require four-week appointment intervals to ensure appropriate monitoring and consideration of a two- to three-month resting period prior to resumption of treatment.

9) Schedule considerations. Children with heavy afterschool activities or parents who must take off time from work for appointments may appropriately go with eight-week appointment intervals, assuming, of course, that some of the other negative considerations listed above are not occurring.

The authors' summary of the 26 references utilized in this article is well done and presented in an enjoyable format. However, most of the specific evidence-based presentation in this article would be too cumbersome to review, so for those of you wanting more specific details and recommendations, I certainly recommend a copy of this for your reading pleasure.

Irrigants Affect Stem Cell Viability in Regenerative Pulp Techniques

Chlorhexidine is toxic to stem cells

By Dennis J. McTigue, DDS, MS

Based on: Trevino EG, Patwardhan AN, et al. Effect of Irrigants on the Survival of Human Stem Cells of the Apical Papilla in a Platelet-Rich Plasma Scaffold in Human Root Tips. *J Endod* 2011; 37 (August): 1109-1115.

Several issues ago I discussed the issue of regenerative endodontic procedures in immature permanent teeth and lamented the lack of evidence to guide us in our treatment. An excellent paper recently published helps to clear the fog a little related to the use of irrigant solutions.

We know that the irrigants used in routine endodontic procedures today are selected primarily on their bactericidal/bacteriostatic and tissue dissolution properties with no consideration regarding their effect on stem cells. In regenerative endodontics, however, the irrigant's ability to promote survival and proliferation of stem cells is really important, and the purpose of this paper was to test the effect of different irrigant disinfection protocols on the survival of stem cells of the apical papilla.

The authors harvested and prepared the apical papillae of extracted third molars to yield a population of stem cells (SCAP). The roots of extracted third molars were sectioned and prepared to standardized segments of 5 mm in length and instrumented to create parallel-walled canal spaces with 1.3 mm apical openings, simulating immature permanent teeth. Four groups of five root segments each were identified. Each group was irrigated with a different commonly used disinfectant solution protocol. Group 1 was 17% EDTA alone; Group 2–6% NaOCl/17% EDTA; Group 3–17% EDTA/2% chlorhexidine (CHX); Group 4–6% NaOCl/17% EDTA/isopropyl alcohol/2% CHX. A suspension of SCAP and plasma rich protein (which served as a scaffold) was then injected into the root canals. Immunohistochemistry and laser scanning

confocal fluorescence microscopy techniques were used to measure the irrigants' effects on stem cell survival.

The authors found that irrigation with EDTA alone best supported cell survival with 89% cell viability followed by the NaOCl/EDTA combination that yielded 74% viability. Interestingly and importantly, the two groups that contained CHX lacked any viable cells.

This is an important paper as I noted earlier. There are no evidence-based guidelines supporting regenerative endodontic procedures. Most of the available literature is comprised of case reports with a huge variety of techniques performed, and many of those cases report the use of CHX. While EDTA is often used in nonsurgical root canal therapy to remove the smear layer and open dentinal tubules to allow access to irrigants thus maximizing their bactericidal/bacteriostatic effects, its use in regenerative endo procedures has rarely been reported. A particularly significant finding in this paper was the apparent toxicity of CHX to stem cells. Also, clinicians treating children with open apices will be thrilled to know that EDTA is preferable to NaOCl with its attendant risk of a painful burn if inadvertently pushed beyond the tooth apex.

Adolescents' Oral Health Should Be Established During Preschool Years

Prevention programs should start at an early age and should include the mother during pregnancy to obtain optimal oral health in children in adolescence

By Arthur J. Nowak, DMD

Based on: Alm A, Wendt LK, et al. Caries in Adolescence-Influence From Early Childhood. *Community Dent Oral Epidemiol* 2011; October 24: epub ahead of print.

What caries risk factors identified at one year of age may have an effect on proximal surface caries at 15 years old? This study attempts to identify those risk factors. This report is a long-term follow-up of a study began when the subjects were one year old and reflects the socioeconomic levels of the population of the community. Information on variables was gathered at one, three, and six years of age. Information on proximal caries lesions and restorations were collected from 24 surfaces when the subjects were 15 years old from BW radiographs analyzed by one of the authors.

At 15 years, 568 of 671 children were available to study. Intra-examiner agreement produced a kappa value of 0.95. Clinical examinations were performed at three and six years with BW radiographs if proximal contacts could not be evaluated. Snacking habits (consumption per week) was collected at one and three years of age. Tooth brushing habits at three years was collected. First dental appointment avoidance was recorded at one year. Oral hygiene was evaluated at one and three years of age. The data was subjected to statistical analysis.

Ninety-five percent of children were using fluoride toothpaste, but no information was provided on community water fluoridation. At 15 years of age, mean surfaces of the decay was 3.2, highest in girls. If there was decay at three and six years of age there was significant caries experience at 15 years of age. If there was consumption of caries risk products at one year of age, there were statistically significant caries associated at 15 years of age. Tooth brushing experience at three years (none or sometimes) was statistically significantly associated with caries at 15 years. Failure to attend the one-year dental examination was statistically significantly associated with caries at 15 years. Caries at six years and the mother's self-estimation of poor oral health was statistically significant with caries experience at 15 years of age.

Caries determinants during early childhood have an impact on a proximal caries in adolescence. Based on these findings:

1. Individualized prevention programs at early ages are important.
2. Foundation for adolescent oral health begins during pre-school years.
3. Tooth brushing with fluoride toothpaste two times a day or more is important to prevent cavities.
4. Tooth brushing behavior is established during infancy and maintained during early childhood and into adolescence.
5. The one-year appointment attendance is important to prevent cavities.
6. Mother's estimate of oral health as poor was associated with cavities in the offspring.

Therefore, prevention programs should start at an early age and should include the mother during pregnancy to obtain optimal oral health in children in adolescence. The study demonstrates the success of a prospective, longitudinal study and supports the need for intervention with the mother during pregnancy, the first-year exam, oral hygiene beginning at one year, and fluoride toothpaste use at least two times a day.

Tylenol Use Associated With Asthma, May Be Causative

It may be time to re-think our recommendations for pain management for children with asthma or at-risk for asthma

By Rebecca L. Slayton, DDS, PhD
Based on: McBride JT. The Association of Acetaminophen and Asthma Prevalence and Severity. *Pediatrics* 2011; 128 (December): 1181-1185.

When it comes to pain management in our child patients, most of us recommend either Tylenol or Motrin. We tend to lean toward Tylenol for fever or

management of pain following tooth extractions and toward Motrin for management of inflammation. Both are preferred over aspirin due to the risk for Reye syndrome in children. Both are available over the counter and, when used appropriately, are considered safe. In recent years, there has been some speculation about the association between Tylenol use and asthma in both children and adults. In this article, the author provides some compelling evidence that challenges the safety of Tylenol use.

This is a review article that investigates the epidemiologic association between Tylenol and asthma in an attempt to provide evidence that this association is causative. This conclusion is based on a number of findings including the strength of the association, the consistent finding across countries, cultures and ages, the presence of a dose-response relationship, and the fact that other environmental influences have not been identified that would explain the increase in asthma prevalence over the last 30 years. From a biologic standpoint, this association is plausible as a result of depletion of airway mucosal glutathione and subsequent vulnerability to oxidant stress. This is consistent with the hypothesis that ingestion of acetaminophen increases airway inflammation in people that currently have asthma or have a predisposition to asthma.

The author reviewed epidemiologic studies of children and adults as well as two prospective studies. In one study of six- to seven-year-old children, the risk for asthma was increased more than three-fold if they took Tylenol at least once per month. There was a 2.5-fold increased risk for adolescents between the ages of 13 and 14 years. When the population attributable risk for Tylenol exposure was calculated, it was determined that there would be a 38% reduction in severe asthma for six- to seven-year-olds and a 43% reduction for 13- to 14-year-olds if exposure to Tylenol was eliminated. There were similar findings in studies done in other countries.

Epidemiologic studies of the association between Tylenol and asthma in adults have also shown increased risk of asthma with odds ratios from 1.7 to 2.8. In another study, a dose response relationship was demonstrated between Tylenol use and both chronic obstructive pulmonary disease and asthma.

The author recognizes that cross-sectional epidemiologic studies cannot prove a causal relationship even when the association is strong. He lists a few confounding factors that might explain these findings, including increased viral illness in persons with asthma, the likelihood that asthma can cause pain, leading to the use of Tylenol to address that pain, and preferential use of Tylenol by children at risk for asthma because parents perceive it is safer than other alternatives.

Prospective trials contribute additional evidence to the causative relationship between asthma and Tylenol. One study enrolled more than 84,000 children who were given either Tylenol or Motrin for fever. There were equal numbers of children with asthma in each of the groups. When children with asthma had a respiratory infection, those taking Tylenol were 2.3 times more likely to require an outpatient asthma visit than those taking Motrin, and the risk was dose-dependent.

Additional evidence to support this causative effect is the increase in pediatric asthma in the United States and other countries that was coincident with the switch to Tylenol from

aspirin in the 1980s after the discovery of the association between aspirin and Reye syndrome. The author's conclusion

is that he no longer recommends Tylenol for his patients with asthma.

reviews

Literature Reviews

For Etiology of Halitosis, Look Beyond the Mouth...

Take Home Pearl:

Gastrointestinal pathology was very common in patients with halitosis regardless of dental or otolaryngological findings, and most patients improved with treatment.

Background: Halitosis is a commonly occurring illness with an unclear etiology. It has often been attributed to oral factors, such as bacteria on the dorsum of the tongue and disease of the periodontium. Other reported risk factors include chronic sinusitis, respiratory tract infections, and habitual mouth breathing. A less reported but possible etiology is gastrointestinal (GI) bacteria, namely *Helicobacter pylori*, which can produce volatile sulfur compounds,

implicated in halitosis, and finally gastroesophageal reflux (GERD).

Objective: To examine halitosis from a GI perspective in children and adolescents.

Methods: This study used a retrospective chart review of subjects where halitosis was a primary or secondary complaint. All endoscopies were performed by the same endoscopist.

Results: Data were collected from 94 subjects with over one third having some type of ENT-related complaint. The most common other presenting symptom was abdominal pain (in 58% of subjects). Less than 2% had dental caries, while 76% had macroscopic ENT abnormalities. Within this group, 26% were positive for *H pylori* and 30% had gastritis.



Acute & Chronic Illnesses

Conclusions: GI-associated halitosis is not as rare as reported.

Reviewer's Comments: This is an older paper, but one of the most common questions I get from parents is about halitosis in kids. Aside from going through all the differentials, it may be appropriate for a referral to the pediatrician with an eye to getting the child to a GI specialist to evaluate GI flora and potential food intolerances as well. I have, in many cases, had physicians who sent the child to the dentist assuming that it was dental in origin, and as this paper suggests, the causes may go deeper.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Kinberg S, Stein M, et al. The Gastrointestinal Aspects of Halitosis. *Can J Gastroenterol* 2010; 24 (September): 552-556.

Managing the Risk of Infective Endocarditis in an At-Risk Population

Take Home Pearl:

Children with infective endocarditis are diagnosed at a mean age of 10 years, with a bimodal distribution in infancy and in late adolescence.

Background: The overall manageability of congenital heart disease (CHD) has improved over the past 20 years, with lower mortality rates and increased long-term survivability. The most significant complication of CHD is infective endocarditis (IE), with a reported prevalence of 6 of 100,000 cases in adults and <1 of 100,000 in children. Approximately 13% of IE cases have underlying CHD.

Objective: To discuss systematically IE in patients with CHD.

Discussion: The mean age of children diagnosed with IE is 10 years,

with a bimodal distribution in infancy and in late adolescence. Unrepaired CHD is associated with increased IE rates (8 of 100,000) in children. The most common CHD associated with IE is ventricular septal defect, followed by tetralogy of Fallot. The tricuspid valve is affected twice as much as the pulmonary valves. Due to lower blood pressure and lower oxygenation, the right side of the heart is more prone to cardiovascular device-related infections. In children, IE is most often associated with the *Streptococcus viridans* group, while in adults it is usually *Staphylococcus*. Clinically, IE should be suspected in children with CHD when there is a persistent fever and manifesting congestive heart failure.

Conclusions: Prospective investigation of differences between children and adults with CHD-associated IE is needed.



Acute & Chronic Illnesses

Reviewer's Comments: This is a really wonderful review of IE in the context of CHD. With improving survival rates, it is not unexpected to see these children in non-hospital practices more often. Practitioners need to understand risk assessment for IE in these patients in the context of providing dental treatment. IE has a low prevalence in children, but often carries severe morbidities with it.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Knirsch W, Nadal D. Infective Endocarditis in Congenital Heart Disease. *Eur J Pediatr* 2011; 170 (September): 1111-1127.

Increased Body Mass Index in Children Often Leads to Hypertension



Take Home Pearl:

Pediatric hypertension is often misdiagnosed due to behavior and poor measurement norms.

Background: Hypertension (HTN) is a significant health problem with multiple organ system morbidities. It has been reported in the literature that there are significant family level morbidities associated with the management of HTN in children. The noted consequences of early life HTN are poorly understood, and in children, due to behavior and poorly established norms, HTN is often misdiagnosed. The majority of pediatric hypertension is secondary to renal or cardiovascular disease.

Objective: To assess HTN and blood pressure status in a group of 7- to 17-year-olds.

Design/Methods: Cross-sectional survey done over 1 year. Group 1 consisted of children aged 7 years, and group 2 were adolescents aged 17 years. Blood pressure was assessed by a standardized and calibrated team.

Results: Data were collected from 4800 children, 2400 in each group. Within the 7-year-olds, the prevalence of overweight (defined as ≥ 85 th percentile) was 6.3%, while it was 9.0% in the 17-year-olds. The overall prevalence of HTN was 2% in the group as a whole. There was a significant association between increasing body mass index and presence of HTN in both groups.

Conclusions: Increased body mass is a significant risk factor for onset of early hypertension.

Reviewer's Comments: As with another article I reviewed in this series, this one demonstrates that our lack of knowledge of the physiologic variables of young children hampers our ability to understand the pathophysiology of obesity and cardiovascular disease in this population. We just don't know where these kids as a group "live" physiologically. This poses a real problem in terms of targeted prevention for these groups.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Shajari H, Shajari A, et al. Relationship Between Arterial Blood Pressure and Body Mass Index of School Age Children of Southern Region of Iran. *Acta Med Iran* 2011; 49 (November): 737-741.

Well-Informed Parents Can Reduce ECC



Take Home Pearl:

Simple educational materials distributed to moms during and after pregnancy can have positive effects on an infant's oral health.

Background: Oral health strategies have been reported for years. Often, reports provide only short-term results, infrequently any long-term results that we would like to see. Prospective longitudinal studies are difficult to organize and manage. Dropout rates in the general population are high, confounding variables great, and controlling behaviors of study groups proves difficult.

Objective: To determine if educational materials on oral health given to mothers during pregnancy and again when the infant was aged 6 and 12 months would reduce the prevalence of early childhood caries (ECC) at age 20 months, and if those effects would be sustained up to the child's age of 6 to 7 years.

Participants/Methods: In 2006, all moms involved in a 2002 study that examined use of educational materials to reduce the risk of ECC were contacted again and received motivational

materials, and again in 2007 and 2008. Of 625 remaining moms, an invitation letter was sent on a follow-up study. A survey was sent and consisted of permission to access children's records from the South Australian school dental service (SA-SDS). Of parents, 80% enroll their children in the SA-SDS from birth to age 18 years and are eligible for a wide range of services provided by dentists and dental therapists. A comparison group of children born in 2002 were recruited so that there were 3 groups that were studied. Usual epidemiological questions along with dental problems, use of dental services, feeding practices, oral hygiene, general health, and social support were included in the survey. Dental examinations were conducted on all children by dental practitioners in the SA-SDS program.

Results: 277 of 625 contacted mothers were available for follow-up. Groups from the initial recruitment in 2002 to the present remained comparable at follow-up at age 6 to 7 years, and the caries prevalence did not differ significantly. However, there was a nonsignificant trend for lowered caries rates in the intervention group. Moms reported children's toothaches: 11% in

the intervention group, 17% in the control group, and 29% in the comparison group. Even though comparisons at age 20 months showed a significant difference between the intervention and control groups, by age 6 to 7 years, the differences were no longer statistically significant.

Conclusions: Initially, there was a significant short-term effect in reducing ECC by age 20 months, but long-term effects were no longer statistically significant by age 6 to 7 years.

Reviewer's Comments: I suspect that, during pregnancy, the moms were motivated in reading the oral health educational materials distributed. Over time, with other children and increasing complexity in child rearing, they may have lost interest, and oral health care lost its importance.

Reviewer: Arthur J. Nowak, DMD
Article Reviewed: Plutzer K, Spencer AJ, et al. Reassessment at 6-7 Years of Age of a Randomized Controlled Trial Initiated Before Birth to Prevent Early Childhood Caries. *Community Dent Oral Epidemiol* 2011; October 24: epub ahead of print.

Cavities in Young Children Related to Lower Perceived OHQoL

Take Home Pearl:

Parents of young children with dental caries perceived that both the children and other family members had a poorer oral health-related quality of life.

Background: Early childhood caries (ECC) is multifactorial and transmissible and is well-documented as the most common disease to affect children of preschool age. We know that ECC disease impacts total body health and quality of life.

Objective: To assess the impact of ECC disease on the general quality of life in a cohort of Hong Kong preschool children and their families.

Methods: The study authors point out that, to date, no population-based studies have assessed the impact of ECC in this way. They attribute this omission of research to the lack of appropriate measures available to evaluate children's oral health-related quality of life (COHQoL), especially in children aged <5 years. In 2007, to properly assess COHQoL, the Early Childhood Oral Health Impact Scale

(ECOHIS) was developed, providing a valid and reliable scale globally in evaluating preschoolers' quality of life as influenced by ECC disease. A random sample of 1296 Chinese preschool children participated in this survey, with a response rate of 97%. Because the target study population was Chinese children, international kindergartens were excluded. Children of Chinese ethnic origin in good general health were included in the survey, and children with major systemic diseases or syndromes were excluded. Using a computer-generated random sampling of kindergarteners, the final sample included preschoolers aged 3 to 5 years with a mean age 4 years. The children were examined by 2 trained and calibrated examiners for ECC status using diagnostic criteria established by the World Health Organization. The children's parents were asked to respond to an ECOHIS survey and additional questions related to their sociodemographic background.

Results: Results showed that decayed teeth were found in 34.3% of children, yet only 5.2% had filled teeth. Parents with less education and lower income reported higher ECOHIS

scores (indicating negative quality of life impact). Children born in mainland China had higher scores in both the child and family impact sections, and higher ECOHIS scores were reported by parents of children with decayed, missing, or filled teeth. Children with severe ECC scores had the highest scores, while children who were caries-free had the lowest scores.

Conclusions: Parents of young children with dental caries perceived that both the children and other family members had a poorer oral health-related quality of life.

Reviewer's Comments: Hong Kong is no different than the U.S. We must continue to advocate for proactive, preventive oral health screenings of children starting at age 12 months to determine those most at risk for ECC disease and possible impaired quality of life. ECC disease is a mostly preventable disease that must guide and inspire all our advocacy and treatment efforts for our youngest patients.

Reviewer: Joel H. Berg, DDS

Article Reviewed: Wong HM, McGrath CP, et al. Oral Health-Related Quality of Life in Hong Kong Preschool Children. *Caries Res* 2011; 45 (August 3): 370-376.

Any Sugar Replacement Is Good...Even If It Has No Direct Plaque Kill Effect

Take Home Pearl:

Xylitol is a good replacement for fermentable sugars in preventing plaque, but it doesn't attack acid production directly.

Background: Both fluoride and xylitol have been used in various forms as prevention agents. We know clearly that fluoride has at least 2 mechanisms of action, in that it inhibits demineralization and promotes remineralization. Fluoride is also known to work in vitro by inhibiting bacterial acid production; however, this acid production inhibitory effect has not been proven in vivo within complex plaque biofilms. Xylitol is a sugar alcohol, which is non-fermentable, and therefore does not cause dental caries, as with other sugar alcohols. Although xylitol does not cause dental caries, similar to fluoride, its inhibitory effect in terms of mechanism of action has not

been confirmed within plaque biofilms in vivo.

Objective: To confirm the inhibitory mechanisms of fluoride and xylitol on the central carbon metabolism of subgingival plaque in vivo, by performing what is known as metabolome analysis, after oral rinsing with either fluoride or xylitol.

Methods: 7 subjects were asked to refrain from brushing overnight and to not consume food for 2 hours to allow plaque to accumulate. Plaque samples were taken and processed to measure baseline metabolite activity. Subjects were asked to rinse with a solution of glucose, xylitol, or a mixture of xylitol and glucose for 60 seconds. For the fluoride test, subjects rinsed with either 225 or 900 ppm sodium fluoride (NaF) solution for 60 seconds. For each test, after 10 minutes, plaque samples were obtained and processed. In the case of the NaF test,

10 minutes later, subjects rinsed again with 1 of the 3 combinations of sugars as above. Differences in amounts of metabolites between resting plaque and plaque collected after various rinse combinations were noted.

Results: After glucose rinsing, pyruvate and glucose 6-phosphate increased significantly, as expected. After xylitol rinsing, there was not any real difference in the metabolite profile from that of untreated baseline plaque specimens obtained. Fluoride treatments, particularly with the higher concentration of fluoride rinse, were evident as measured by changes in metabolites, confirming the effects previously only reported in vitro. In contrast, there were no clearly evident changes in the presence of xylitol.

Reviewer's Comments: Although fluoride rinse 10 minutes in advance of a glucose challenge significantly inhibited acid production in this in vivo

study of supragingival plaque, it is still not clear what might happen with supragingival plaque that exists in the case of active caries activity, where the composition and structure of the biofilm may be different. Xylitol had no effect

on the metabolite profile and thus no effect on acid production within plaque specimens in this study. In spite of this, we know that mere substitution of xylitol for sugars that can be perfected can clearly prevent disease.

Reviewer: Joel H. Berg, DDS
Article Reviewed: Takahashi N, Washio J. Metabolomic Effects of Xylitol and Fluoride on Plaque Biofilm In Vivo. *J Dent Res* 2011; 90 (December): 1463-1468.

ADHD Is a Caries Risk Factor

Take Home Pearl:

When a regression analysis was done, the only significant associations for caries were attention-deficit hyperactivity disorder diagnosis and maternal education.

Background: Attention-deficit hyperactivity disorder (ADHD) has an overall prevalence of 3% to 6%, making it the most common developmental disorder among school children. Typically males are diagnosed, but it has been reported that there may be a diagnosis bias, as females may present with subclinical behavioral effects. In subjects with ADHD, behavioral functioning is typically 30% below chronologic age. ADHD has been reported as a reason for increased caries risk.

Objective: To assess longitudinal oral health from a group of previously studied children aged 11 to 13 years, who are now aged 17 years.

Participants/Methods: Subjects were born in 1991 in Stockholm, and 114 controls and 35 ADHD subjects were examined at ages 11 and 13 years. Of these, 55 controls and 32 ADHD subjects were examined again at age 17 years, using a caries grade, gingival index, diet, and oral hygiene survey.

Results: The ADHD children had significantly more decayed surfaces and more severely decayed teeth. When a regression analysis was done, the only significant associations for caries were ADHD diagnosis and maternal education.

Conclusions: ADHD was an increased risk for caries and gingival problems in children.



Developmental Disabilities

Reviewer's Comments: The fact that this group retained >90% of their ADHD subjects over a 6-year period is impressive. There are so many other variables, namely "not all ADHD kids are equal," so there could be other variables influencing the outcomes. Furthermore, we are assuming that there is no reporting bias by subjects in that they weren't just saying what the researchers wanted to hear, which could skew results significantly.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Blomqvist M, Ahadi S, et al. Dental Caries in Adolescents With Attention Deficit Hyperactivity Disorder: A Population-Based Follow-Up Study. *Eur J Oral Sci* 2011; 119 (October): 381-385.

Children With CP Have Difficulty in Understanding Their Control of Movements

Take Home Pearl:

Children with cerebral palsy have a reduced ability to determine whether movement of a virtual moving object is caused by themselves or an external source.

Background: Aside from being a non-progressive sensory/motor disorder, cerebral palsy (CP) also affects the perception and cognitive abilities of children. There have been reports of the difficulty in children discerning between self-produced movements and those from an external environment. This is termed a sense of agency (SOA). The SOA may be tested by what is known as the alien hand experiment, in which subjects watch themselves drawing a straight line through a view box, and the image may be switched to an experimenter's hand doing a different motion. Those

with a poor sense of agency would modify their own movements based on what they are seeing.

Objective: To assess the SOA in children with CP.

Design/Participants: Cross-sectional study accomplished using subjects with spastic hemiplegia.

Methods: The upper limb function was determined by the Manual Ability Classification System. Furthermore, 7 visual tests were grouped in the Test of Visual Perception Skills.

Results: Data were collected from 48 (24 in each group) subjects with a mean age of 11 years. Controls responded quicker when the line drawn deviated from straight. When there was a deviation, the CP subjects reported more often that it was their fault, indicating a poor sense of agency. The CP subjects also had large compensatory movements when perceiving deviation.



Developmental Disabilities

Conclusions: Children with CP demonstrated a poor sense of agency.

Reviewer's Comments: This is a remarkable paper in that it demonstrated not only the physical deviations but also the psychology of SOA. When I think of the CP kids I treat and when I prepare to examine them or do dental work, I wonder how I can trigger so many primitive, retained reflexes, and yet the child probably thinks it's their fault, which is probably incredibly frustrating for them.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Rosenbaum AR, Christensen MS, et al. Altered Sense of Agency in Children With Spastic Cerebral Palsy. *BMC Neurol* 2011; 11 (November 30): epub ahead of print.

Managing Bruxism in a Child With CP



Take Home Pearl:

Increased incidences of malocclusion and oral myofunctional disturbances may lead to increased bruxism in children with cerebral palsy.

Background: Cerebral palsy (CP) is a non-progressive motor disorder with an overall incidence of 2.4 of 1000 births. The most common features of cerebral palsy are mental retardation, speech disturbances, and epilepsy as well as motor dysfunction, which is the hallmark of CP. The most often reported dental findings are increased plaque, delayed eruption of secondary molars, malocclusion, and bruxism. The overall prevalence of bruxism in the general population is approximately

21%, and it may be higher in children with CP due to malocclusion, myofunctional disturbances, and sleep disorders, which are often under-reported or misdiagnosed in children with CP.

Objective: To discuss the management of bruxism sequela in a child aged 7 years with CP.

Case Report: A 7-year-old boy with spastic quadriplegic CP had worn his teeth down to gum line. Under general anesthesia, stainless steel crowns were placed on posterior teeth, and subsequently resin splints were placed over the stainless steel crowns. The bruxism stopped, and the parents reported that his feeding improved.

Conclusions: Bruxism can be a significant hurdle for the daily function of children with CP.

Reviewer's Comments: I am always loath to base protocols off of case reports, as this paper attempts to do. Cases such as this are so individualized in terms of not only diagnosis but also caregiver responsibility and involvement that it makes broad declarations for intervention difficult to swallow. I do think this paper presents a great review of bruxism in the CP population, and for that reason it is a good read.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Oliveira CA, de Paula VA, et al. Bruxism Control in a Child With Cerebral Palsy. *ISRN Dent* 2011; December 1: epub ahead of print.

Why Do We Prescribe Antibiotics?



Take Home Pearl:

Of all respiratory conditions treated with antibiotics, it was determined that antibiotics were indicated in 49% of cases.

Background: Antibiotics represent the most common class of prescribed medications with >30 million annual pediatric prescriptions. In many instances, the antibiotics are prescribed for viral causes and not indicated. During the 1990s, there has been an increased concept of antibiotic stewardship regulating the appropriateness of prescriptions.

Objective: To examine the overall utilization rate of antibiotics in a pediatric population and note the factors associated with broad-spectrum antibiotic use.

Methods: Data were collected from the National Ambulatory and National

Hospital Ambulatory Medical Care surveys from 2006 to 2008, which was a cross-sectional survey that assessed ambulatory visits in children aged 0 to 18 years.

Results: Antibiotics were prescribed at >21% of all ambulatory visits recorded; of these, broad-spectrum antibiotics were prescribed 50% of the time. The most common class of medications was narrow-spectrum penicillins and macrolides. The macrolides constituted 40% of all broad-spectrum prescriptions. The most common reasons antibiotics were prescribed were respiratory conditions followed by skin conditions. Within the respiratory category, it was determined that antibiotics were indicated in 49% of cases.

Conclusions: These findings can inform the development and implementation of antibiotic stewardship efforts in ambulatory care toward the most

important geographic regions, diagnostic conditions, and patient populations.

Reviewer's Comments: I've long been interested in the concept and execution of 'antibiotic stewardship,' which is a very common approach and philosophy in Europe. This article demonstrates the chronic overuse of antibiotics, particularly the broad spectrum. I had a parent the other day tell me their own gingivitis was 'cured' by an antibiotic prescription given by their general dentist – I wasn't totally shocked. It is well reported also in many instances that antibiotic prescriptions are given for viral-based illness, more of a panacea to the patient than actual empirical therapy.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Hersh AL, Shapiro DJ, et al. Antibiotic Prescribing in Ambulatory Pediatric in the United States. *Pediatrics* 2011; 128 (December): 1053-1061.

Children, Adolescents With ADHD Have Special Health Care Needs



Take Home Pearl:

This document updates and replaces the 2000 and 2001 clinical guidelines for diagnosis and treatment of attention-deficit hyperactivity disorder.

Discussion: The primary care clinician should initiate an evaluation for attention-deficit hyperactivity disorder (ADHD) for any child aged 4 through 18 years who presents with academic or behavioral problems and symptoms of inattention, hyperactivity, or impulsivity. In order to make a diagnosis of

ADHD, the primary care clinician should determine that *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* criteria have been met. When evaluating a child for ADHD, the primary care clinician should include assessment for other conditions that might co-exist with ADHD, including

emotional or behavioral, developmental, and physical conditions. The primary care clinician should recognize ADHD as a chronic condition, and therefore consider children and adolescents with ADHD as children and youth with special health care needs. The recommendations for treatment of children and youth with ADHD vary depending on the patient's age and should include: preschool-aged children, elementary school-aged children and adolescents. The primary care

clinician should titrate doses of medication for ADHD to achieve maximum benefit with minimum adverse effects.

Reviewer's Comments: Those of us who grew up and were trained with little knowledge of and/or experience in dealing with ADHD can benefit from reading this new guideline. I, for one, had little experience or knowledge of ADHD. Pediatric dentists and those dentists seeing children are sure to encounter patients with a history of a

diagnosis of ADHD. This guideline will be beneficial to those health care providers who may be involved with ADHD children.

Reviewer: Paul O. Walker, DDS, MS
Article Reviewed: Subcommittee on ADHD, Steering Committee on Quality Improvement and Management. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *Pediatrics* 2011; 128 (November): 1007-1022.

Making Nasal Sedation More Palatable



Pharmacologic

Take Home Pearl:

The intranasal discomfort score appeared reproducible for assessing painful intranasal drug administration.

Background: In procedural sedation for children, the oral route is one of the most often used. Drawbacks to this route include compliance, unpredictable absorption, and the inability to redose. The intranasal route has been reported to have more control, no compliance issues, and a quicker onset. The major drawback with the intranasal route is the report of pharyngeal pain.

Objective: To develop a reproducible score to assess pharyngeal pain and to test different approaches to minimize it.

Participants/Methods: Subjects were aged 20 to 40 years, and exclusion criteria included pregnancy, allergy to local anesthetic, asthma attacks, previous sinus surgery, or nasal polyps. At visit 1, placebo versus citrate was tested; visit 2, atomizing versus drops of citrate; visit 3, pre dosing with lidocaine; and visit 4, lidocaine plus citrate. Pain was rated on an NIH scale of 1 to 10, and an intranasal discomfort score (INDS) based on pain, burning and taste was devised.

Results: Over 12 months, 18 subjects completed the 4 visits. There was no significant difference between citrate and saline between 4 visits. The INDS was highly reproducible over the 4 visits. Taste was the longest lasting unpleasant feeling.

Conclusions: The INDS was a reliable and reproducible assessment tool.

Reviewer's Comments: I was interested in this because I do a lot of nasal sedations and my experience is that, while the initial administration is unpleasant, the agitation does not affect the sedation outcome if the patients are properly selected. It was interesting that taste had such a lingering effect compared to burning and pain. This study used different solutions in differing nares, and that may have impacted the outcomes. However, the introduction makes a great point – this is a wonderful alternative to oral sedatives, particularly for very young children where spitting up is a possibility.

Reviewer: S. Thikkurissy, DDS, MS
Article Reviewed: Antonio C, Zurek J, et al. Reducing the Pain of Intranasal Drug Administration. *Pediatr Dent* 2011; 33 (September-October): 415-419.

Electric Pulp Testing Effectively Determines Pulp Status in Primary Teeth



Pulp Therapy

Take Home Pearl:

Electric pulp testing is more effective than heat or cold testing or combinations of sensibility tests when evaluating primary molars.

Objective: To determine the ability of thermal and electrical pulp tests to evaluate pulp status in primary teeth.

Participants: 36 children (78 primary molars) aged 6 to 8 years.

Methods: Using standardized techniques, each molar was tested with heat, cold, and electric pulp testing. After testing, each tooth received pulp treatment so that the clinical status of the pulp could be correlated to the results of diagnostic tests. For

each individual test, the sensitivity, specificity, positive-predictive value, negative-predictive value, and accuracy were calculated. Combinations of diagnostic tests were also assessed.

Results: Electric pulp testing on its own was the most useful technique for determining pulp status in primary molars. The electric pulp test was more accurate than either of the thermal tests alone or in combination.

Conclusions: Clinicians looking to bolster their diagnostic accuracy for primary teeth with large carious lesions can look to electric pulp therapy as a useful tool.

Reviewer's Comments: For me, 2 points of interests arose from this paper. (1) Of interest was the lack of quality evidence with regard to the

efficacy of primary tooth pulp testing prior to publication of this paper. In my time as an undergraduate and graduate student, I was led to believe that pulp testing of primary teeth was, at best, equivocal. Despite my usual skepticism, I accepted this teaching as real evidence. As it turns out, little evidence was available to support that point of view. In fact, the single paper cited in the introduction to this paper concluded that pulp testing was valid but did not provide the common statistical analysis for assessing diagnostic tests. (2) The authors of this manuscript have provided the sensitivity, specificity, and positive- and negative-predictive values, as well as accuracy, for each pulp test. As well, they tested the techniques in combination. Providing these statistical assessments allows a clinician to

determine if a specific diagnostic modality tends to detect false positives and/or false negatives that are a part of any diagnostic assessment. These values allow the clinician to select tests that best fit with the clinical nature of the condition that they are assessing. Electric pulp testing had a sensitivity of

80.0%, a specificity of 92.5%, and an accuracy of 0.891. These values define electric pulp testing as able to detect disease when present and, with a higher degree of probability, able to diagnose absence of pulp disease. These parameters are more than adequate for primary pulp testing.

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

Article Reviewed: Hori A, Poureslami HR, et al. The Ability of Pulp Sensibility Tests to Evaluate the Pulp Status in Primary Teeth. *Int J Paediatr Dent* 2011; 21 (November): 441-445.

Large Range of Global Variance in Cardiometabolic Variables in Children



Risk Management

Take Home Pearl:

Metabolic syndrome is comprised of central obesity, glucose dysregulation, dyslipidemia, and hypertension.

Background: Globally, there has been an increase in the overweight status of children, among all ethnic groups. This has led to a pan-increase in the prevalence of type II diabetes. Furthermore, there has been an increase in the prevalence of metabolic syndrome, which is comprised of central obesity, glucose dysregulation, dyslipidemia, and hypertension. There are no good pediatric cutoffs to begin to suspect metabolic syndrome in children.

Objective: To perform a systematic review of pediatric cardiometabolic variables.

Methods: The authors searched PubMed, EMBASE, and the Cochrane database for the following keywords: overweight, obesity, and metabolic syndrome for studies with patients aged 0 to 18 years with >50 subjects to qualify.

Results: There was a very wide range of cardiometabolic variables. For example, while 9% of German children had low HDL levels, 57% of children from rural America had low HDL levels. Additionally, there was elevated blood pressure in 9% of Italian children and in 41% of Hungarian children. There were ethnic variations within each country as well.

Conclusions: Globally, there is a large range of variance in cardiometabolic variables in children as well as among ethnicities.

Reviewer's Comments: This is an interesting global think piece; unfortunately, with such a range of data collection criteria (the assessments were not validated) there can be a lot of wiggle room, which I believe the variance here demonstrated. Some countries may require repeated blood pressure readings, while others do not. The topic is clinically very important, and really what is needed is some standardized global measure/assessment.

Reviewer: S. Thikkurissy, DDS, MS

Article Reviewed: van Vliet M, Heymans MW, et al. Cardiometabolic Risk Variables in Overweight and Obese Children: A Worldwide Comparison. *Cardiovasc Diabetol* 2011; 10 (November 24): epub ahead of print.

Children With Prader-Willi Syndrome Have Oral Health Issues



Soft Tissues

Take Home Pearl:

Prader-Willi syndrome is a complex genetic disorder whose key feature is hyperphagia, which may lead to life-threatening obesity and must be diagnosed early and appropriate treatment initiated.

Background: Prader-Willi syndrome (PWS) is a rare and complex genetic disorder that typically exhibits short stature, low muscle tone, incomplete sexual development, cognitive disabilities, problem behaviors, and an intense hunger leading to excessive eating and life-threatening obesity.

Objective: To assess the impact of self-destructive behaviors and qualitative and quantitative saliva abnormalities on the oral mucosa in children with PWS.

Participants/Methods: The study sample included a test group of 15 children with PWS (mean age, 9.8 years) and a control group of 15 healthy children (mean age, 11.5 years). The study involved the assessment of self-destructive behaviors, such as picking at the skin, physical and chemical saliva characteristics, and clinical status of the oral mucosa. Patients' caregivers were interviewed regarding the children's compulsive picking of the skin. A clinical intraoral examination was used to determine the presence, type, and site of lesions involving the oral mucosa, and mycology material was obtained using the direct swab method to determine the presence of *Candida* and yeast-like fungi. Saliva samples were evaluated using the Saliva-Check Buffer Test to include moistening rate of the lower lip mucosa, visual assessment of the saliva consistency, unstimulated saliva

pH, stimulated saliva secretion rate, and the stimulated saliva buffer capacity. Statistical analysis included the t-test and Spearman rank correlation coefficient.

Results: 12 of 15 subjects with PWS demonstrated compulsive picking of the skin compared to none in the control group, and the injurious lesions to the oral mucosa, to include biting of the lips and cheeks, were found in children prone to picking at the skin. Those subjects with PWS exhibited a slower oral mucosa moistening rate than the control group, and all 15 of the PWS subjects had either a frothy or sticky frothy saliva consistency compared to none of the control group. The PWS patients had statistically significant lower resting saliva acidity, (pH 6.08) in contrast to the control group (pH 7.29) and significantly lower values of stimulated

saliva. *Candida* was found more frequently in the PWS group than the control subjects, 12 to 2 respectively, and the density of yeast-like fungi was also higher.

Conclusions: A decreased quantity and unfavorable properties of saliva and self-destructive behaviors predispose children with PWS to injurious lesions of the oral mucosa and oral candidiasis.

Reviewer's Comments: Although this is a very interesting study, there was a very small sample size and the control group was on average 2 years older than the test cases. How were the test subjects and controls recruited? How many investigators performed the clinical examinations and interviews and were both accomplished by a single examiner for each subject? Were both conducted in a consistent and standardized manner? No data collection

period was noted, nor was there any interexaminer reliability evaluation.

Reviewer: Erwin G. Turner, DMD
Article Reviewed: Olczak-Kowalczyk D, Witt A, et al. Oral Mucosa in Children With Prader-Willi Syndrome. *J Oral Pathol Med* 2011; 40 (November): 778-784.

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1. Xylitol is a fermentable sugar alcohol that causes dental caries.
Practice: T F **Answer Submitted: T F**
2. Electric pulp testing adds no beneficial information when evaluating pulp status in primary teeth.
Practice: T F **Answer Submitted: T F**
3. When it comes to orthodontic treatment appointment intervals, all patients can be scheduled for regular 4-week intervals.
Practice: T F **Answer Submitted: T F**
4. Routine endodontic procedures performed with chlorhexidine provide the best tissue dissolution and stem cell survival.
Practice: T F **Answer Submitted: T F**
5. Simple educational materials distributed to moms during and after pregnancy can have positive effects on an infant's oral health.
Practice: T F **Answer Submitted: T F**
6. An article by McBride states that the association between Tylenol use and asthma is found only in young children.
Practice: T F **Answer Submitted: T F**
7. In a recent study by Olczak-Kowalczyk et al, self-injurious lesions of the oral mucosa in children with Prader-Willi syndrome were found in those subjects prone to picking at their skin.
Practice: T F **Answer Submitted: T F**
8. The prevalence of acquired von Willebrand disease is much greater than that of inherited von Willebrand disease.
Practice: T F **Answer Submitted: T F**
9. In a recent study conducted on Chinese children, parents of children with dental caries perceived that there was an associated poorer oral health-related quality of life.
Practice: T F **Answer Submitted: T F**
10. Attention-deficit hyperactivity disorder is limited to preschool-aged and elementary school-aged children.
Practice: T F **Answer Submitted: T F**
11. A recent study found that consumption of caries risk products at age 1 year had no association with caries at age 15 years.
Practice: T F **Answer Submitted: T F**
12. There was a large variance of vital sign variation among different ethnic groups within surveyed countries in a recent study.
Practice: T F **Answer Submitted: T F**
13. Increased body mass is a significant risk factor for onset of early hypertension.
Practice: T F **Answer Submitted: T F**
14. The difficulty in discerning between self-produced movements and those from an external environment is called a sense of agency.
Practice: T F **Answer Submitted: T F**
15. Bruxism can be a significant hurdle for the daily function of children with cerebral palsy.
Practice: T F **Answer Submitted: T F**
16. The most common congenital heart disease associated with infective endocarditis is atrial septal defect.
Practice: T F **Answer Submitted: T F**
17. In a recent study, more than one third of subjects with halitosis had some type of ENT-related complaint.
Practice: T F **Answer Submitted: T F**
18. The most common class of medications prescribed in the pediatric population is narrow-spectrum tetracyclines.
Practice: T F **Answer Submitted: T F**
19. A recent study found that children with attention-deficit hyperactivity disorder had significantly more severely decayed teeth.
Practice: T F **Answer Submitted: T F**
20. A recent study found that the intranasal discomfort score appeared reproducible for assessing painful intranasal drug administration.
Practice: T F **Answer Submitted: T F**

1. **T** The pH level is higher after a sucrose challenge when the peptide-containing rinse C16G2 is used.
2. **T** On the basis of a recent study by Huth, et al, at 3 years post-treatment, calcium hydroxide pulpotomy is the least effective technique, and based on absolute values, ferric sulfate is the most effective technique for the management of caries-exposed pulp in symptom-free primary molars.
3. **T** Photostimulable phosphor plates in barrier envelopes may exhibit microbiological contamination.
4. **F** With regard to information available on the Internet, professional organizations have the lowest overall reliability and accuracy scores.
5. **F** Supporting an association between fluoride and osteosarcoma, studies have shown that the fluoride concentration in bone specimens from osteosarcoma patients is significantly higher than that in control subjects.
6. **T** The recent study by Levy et al found that compared to children living in smoke-free homes, children living with 1 smoker in the home missed 1.06 additional school days, and those living with ≥ 2 smokers missed 1.54 more days per year.
7. **F** The posterior superior alveolar block is more successful in achieving maxillary molar anesthesia than infiltration anesthesia.
8. **T** Many dentists do not seal noncavitated carious lesions.
9. **F** In children presenting with a toothache, pulpal involvement is the least common finding.
10. **F** Procedural restraint is rarely used in preverbal children.
11. **F** On the day of eruption, the signs and symptoms of teething are about the same as noneruption days.
12. **T** Among adolescents, health literacy is strongly linked to the safe use of acetaminophen.
13. **T** The most common site of recurrent pain in children with cerebral palsy is the lower back and hips.
14. **F** According to Friedman et al, there is a very small (<1%) complication rate following surgical management of obstructive sleep apnea in children.
15. **T** Secondary malignancy neoplasm has been reported in children with acute lymphoblastic leukemia 15 years later.
16. **T** Most nurses assess pediatric pain based on altered patient function.
17. **F** In high-alert medications (HAMS), the medication error rate is low.
18. **F** Less than 1% of all parents of children in pain report psychiatric problems.
19. **F** Infant response to parent behaviors is strongest at 2 months of age.
20. **T** Aspirin should not be used in children recovering from flu-like symptoms.

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