Does Ozone Kill Cariogenic Bacteria?

**Antibacterial Effect of Ozone on Cariogenic Bacterial Species.**

Johansson E, Claesson R, van Dijken JW:

*J Dent;* 37 (449-453):

Continued development of ozone delivery to tooth surfaces might prove helpful in arresting caries.

**Background:** We continually look for better ways to slow down or hopefully even arrest the caries process. It is well known that oxygen, particularly in the form of ozone, can be effective in reducing the number of or even killing cariogenic microflora. Recently, a device had been developed to manufacture and deliver ozone in situ, on the tooth, with the intention of killing the caries-causing bugs and thereby halting the progression of demineralization.

**Objective:** To evaluate the HealozoneTM device in terms of its ability to kill a variety of cariogenic organisms based on delivery time of the ozone and whether or not the surface treated was contaminated with saliva.

**Methods:** Caries-causing bacteria of the genera *Actinomyces*, *Lactobacilli*, and *Streptococcus* in either a buffered saline solution or in saliva were treated with 10-, 30- or 60-second exposures of ozone and were cultivated on agar plates in vitro. The percentage of bacteria of each of the genera with the various treatment times, and with or without saliva contamination was calculated.

**Results:** After 10 seconds of exposure to ozone, the vast majority of bacteria of each type were killed. After 10 or 30 seconds of exposure, the *Lactobacilli* and *Streptococcus* types of bacteria were less efficiently killed when contaminated with saliva, but after 60 seconds, even with saliva contamination, nearly all bacteria were killed. The results of this study are consistent with those of many other in vitro studies and a few clinical studies that have examined the killing effect of the Healozone device on cariogenic bacteria. Other work has also shown that removal of debris and biofilm from the surface has aided not only in kill rates of the microflora, but also in halting progression of existing caries demineralization. Work by Lynch and others has, in several clinical instances, shown that even when leathery-type demineralization was exhibited clinically and was subsequently treated with the Healozone device, progression of lesions can be halted. Some early work has even shown reversal of lesions in the form of increase in dentin microhardness suggesting remineralization.

**Conclusions/Reviewer's Comments:** The present study shows only the core potential of the Healozone device to kill caries-causing bacteria. This work combined with the work of other studies showing the need to debride the surface might yield better clinical findings in a study designed to test the combined effect of some caries-affected tooth structure removal combined with ozone therapy. In considering better ways to treat the earliest manifestations of early childhood caries on the lingual surface of primary incisors, this combined technique might yield benefit.

**Additional Keywords:** Ozone

**print tag:** () Refer to original journal article.
Teeth Could Retain Potential for Sensation, Healing, and Repair

Pulpal Status of Human Primary Teeth With Physiological Root Resorption.

Monteiro J, Day P, et al:

*Int J Paediatr Dent*; 19 (January): 16-25

Although no anatomic differences were found between intact and resorbing primary molars, the authors of this study were unable to infer differences in pulp functional status from their data.

**Objective:** To compare the pulpal innervation density, immune cell accumulation, and vascularity in human non-caries primary molars with differing amounts of root resorption.

**Design:** Human histological study.

**Methods:** Maxillary and mandibular non-caries primary molars with varying stages of resorption were the experimental sample. Immediately after extraction, the teeth were split and the pulp removed and prepared such that 15 sections of pulp tissue were derived from each molar. Sections were stained to assess innervation, vascularity, and immune cell accumulation. The teeth were grouped by the degree of root resorption present at time of extraction.

**Results:** 64 molars were the sample; 31 had less than one third resorption, 25 had between one third and two thirds resorption, and 8 had resorption greater than two thirds. Assessments of the pulp tissue sections were carried out for the mid-coronal and pulp horn regions. No differences in innervation, vascularity, or immune cell accumulation were detected.

**Conclusions:** The investigators concluded that their study quantified that statistically significant differences in innervation, vascularity, or immune cell accumulation could not be detected in resorbing primary molars.

**Reviewer's Comments:** This study is one of very few investigations that have tried to answer questions about how the pulp changes in resorbing primary teeth. Clinicians would like to know the point during resorption of a primary tooth that pulp therapy is no longer a choice due to changes in the pulp. They also want to know the point when the resorptive process is sufficiently advanced that local anesthesia no longer is required for restorative treatment. This investigation assessed anatomic or structural aspects of the dental pulp of primary teeth with resorbing roots. Although the methods employed in this study provided no physiological or functional data about the dental pulp of the resorbing primary tooth, the information provided on structural aspects of the pulp suggests that little change occurs within the pulp tissues as resorption progresses. On that basis and until functional or neurophysiological data are produced, information on the structural status of the pulp of the resorbing primary tooth is the only evidence to guide dentists' actions. With no pulp anatomic changes apparent, one may speculate that the reparative capacity of the pulp persists after significant resorption has occurred and that sensation, as suggested by the persistence of nerve fibers, continues far along in the process of resorption. On the basis of these results, dentists may opt for late pulp treatment in situations where a child may benefit, and when providing that pulp therapy, should assume that anesthesia will be required.

**Additional Keywords:** Root Resorption

**print tag:** () Refer to original journal article.
Stressful Mealtimes, Respiratory Stress, Failure to Thrive - Signs of Pediatric Dysphagia

An Overview of Pediatric Dysphagia.

Early detection of dysphagia in infants and children is important to prevent or minimize complications.

Background: On January 28, 2009, the American Academy of Pediatric Dentistry (AAPD) released the press release, "Most Parents and Caregivers Unaware Their Best Intentions May Be Fostering Tooth Decay in Children," which highlighted the fact that the longer children's teeth are exposed to food, the more damage is done. Infants and children can experience swallowing problems or dysphagias that can increase oral food contact and the risk for tooth decay. Infants and children rely on their parents and healthcare providers to be alert to the signs and symptoms of their swallowing problems.

Objective: To review the etiologies, symptoms, and treatments regarding the management of pediatric dysphagia.

Design: Review paper.

Etiologies: Prematurity, gastroesophageal reflux, neurological conditions like cerebral palsy, congenital malformations, and behavioral problems can all create dysphagias. Prematurity is often associated with underdeveloped sucking pads, lungs, and oral motor strength. This can create a lack of coordination of respiration and swallowing. Behavioral feeding disorders, such as an aversion to textures, pocketing or holding food in the cheeks, and food avoidance have also been noted in infants and children with dysphagias.

Signs and Symptoms: Projectile vomiting, coughing, choking, and instances of silent aspiration are signs of dysphagia. Other signs include: a child having little interest in eating, straining of muscles during feedings, extensive time required to eat, spilling of food or liquid out of the mouth, emesis, coughing and gagging during feeding, challenges with breathing/stridor when feeding, and failure to thrive. The presence of tongue thrusting during swallowing is also associated with dysphagia.

Assessment: Asking the following 4 questions can provide significant insight into whether dysphagia exists: (1) How long do mealtimes typically take? If more than about 30 minutes on any regular basis, there is a problem. (2) Are mealtimes stressful? (3) Does the child show any signs of respiratory stress or aspiration? (4) Has the child not gained weight in the past 2 to 3 months?

Treatment Options: Swallowing therapy often involves modifying diet or liquid texture/temperature/volume and repositioning of posture to achieve optimal swallowing during meals. Sometimes, slowing the rate of presentation of food or liquid into the oral cavity may help with swallowing. Therapy that includes both oral stimulation, which will increase oral motor strength and coordination, and the use of adaptive feeding equipment such as varied spoon size and shape or nipple size, shape, and flow rate which may help aid in swallowing.

Conclusions: Early detection of risk factors or etiologies will minimize complications of swallowing problems in infants and children.

Reviewer's Comments: The AAPD states that proper oral care is important in ensuring children enjoy overall good health. Proper diet and nutrition directly impact both oral and overall health. Early detection of pediatric dysphagias will minimize complications.

Additional Keywords: Etiologies/Symptoms/Treatments

print tag: () Refer to original journal article.
Mandibular Fx Most Common Facial Fx in Children


CT scans are superior to plain radiographs in detecting midfacial fractures.

Objective: To review and analyze the epidemiology of facial fractures in children over 2 time periods.

Design: Retrospective chart review.

Participants/Methods: The study sample included the records of children age 15 years who were treated for facial fractures in the Department of Oral and Maxillofacial surgery at Helsinki Central University Hospital. Injuries between 2 recent 10-year time periods were reviewed and data were collected on gender, age, cause and site of injury, and type of fracture.

Results: 378 children (62% boys, 38% girls) sustained facial fractures during the periods studied. The age range was 1.5 to 15.5 years with an average of 12 years. In total, 12% of the study group was aged 5 years and 45% were age 13 years. There were no differences noted between the 2 time periods for absolute numbers of injuries, male predilection, and increasing injury occurrence with age. The most common causes of injuries in girls were bicycle accidents (33%) and sports injuries (15%). For boys, bicycle accidents (25%), motor vehicle accidents (MVA) [22%], and assault (15%) were the leading causes. Relative to age, children age 5 years were most frequently injured by falls (43%), but the proportion of injuries due to MVA, sports, and assaults increased. Almost one fourth of injuries to children age 13 to 15 years were a result of violence. Overall, mandibular fractures comprised a significant majority of facial fractures (74%) and the condyle was the most common fracture site (61%). Midfacial fractures accounted for 15% and the remainder were dentoalveolar and/or upper third of the face. The proportion of mandibular fractures alone decreased from 73% in children age 5 years to 66% in children age 13 years. Midfacial fractures alone occurred in only 2% of the youngest age group to 22% in the oldest. Midfacial fractures increased from 7% in the first time period to 26% in the second.

Conclusions: Mandibular fractures were the most common facial fractures. Assault-related injuries and midfacial fractures increased significantly from the first time period to the second.

Reviewer’s Comments: While this study is limited to treatment at one city hospital, its results are consistent with similar papers published in the last few years. One difference is the apparently increasing incidence of midfacial fractures in older children. The authors note that this may be due to the increased use of computerized tomography in diagnosing facial injuries. They report that CT scans are superior to plain radiographs in detecting midfacial fractures and these injuries may have been missed prior to the use of CT.

Additional Keywords: Dentoalveolar Injuries
Seal the Teeth and Prevent Decay!

Caries Risk in Formerly Sealed Teeth.
Griffin SO, Gary SK, et al:
J Am Dent Assoc; 140 (April): 415-423

Sealant loss does not make the surface more vulnerable to decay than surfaces never sealed.

**Background:** By late adolescence, the vast majority of children will experience decay especially on the occlusal surfaces of posterior molars. Children from low-income families are the most vulnerable to decay. Sealants placed in clinical or school settings are highly effective in reducing decay on the sealed surfaces. Only 30% of children in the United States have had their at-risk teeth sealed.

**Objective:** To determine the vulnerability to caries in tooth surfaces formerly sealed and if they are at greater risk than teeth never sealed.

**Design:** Review of the literature with risk assessment.

**Methods:** The English literature was reviewed between 1990 and 2005. Five systematic reviews, which included 37 studies were selected. Outcomes and risk measures were determined.

**Results:** Seven studies were included in the final body of evidence. Three of 7 studies use UV polymerization; 3 of 7 used autopolymerization, and 1 of 7 used both sealant systems. Subjects ranged from ages 5 to 14 years; only permanent molar data were used. In all studies, teeth were examined using visual or tactile methods. After 1 to 1.5 years, 5% to 21% of sealants were lost; after 4 years, 19% to 37% sealants were lost. Relative mean risk to developing caries in a formerly sealed tooth versus a non-sealed tooth was: after 1 year (0.94); after 2 years (0.91); after 3 years (0.93); and after 4 years (0.93).

**Conclusions:** Individual teeth with partial or fully lost sealants are not at greater risk of developing cavities compared to teeth that were never sealed.

**Reviewer's Comments:** With this review data and experiences from practice, it is very difficult to understand why 70% of children in the U.S. have not had sealants placed on high-risk molar surfaces? The concerns of sealing in decay or the sealants falling off can no longer be used. Studies now report that this should not be a concern if we continue to follow manufacturers' recommendations and periodically check on retention of sealants. But some children will not be followed. The authors of this report say those tooth surfaces are no more at risk than if they were not sealed.

**Additional Keywords:** Caries Risk

print tag: () Refer to original journal article.
Genomewide Association Studies Aid in Identification of Disease Loci

Genomewide Association Studies and Human Disease.
Hardy J, Singleton A:
N Engl J Med; 360 (April 23): 1759-1768

Discussion: Our ability to understand the genetic basis of complex disorders, even those with a behavioral element, has been drastically improved in the last few years with the ability to perform genomewide association studies. Sequencing done as part of the Human Genome Project laid the groundwork for the genomewide association studies that followed. In addition to sequencing of the entire genome, this project identified genetic sequence variants, commonly referred to as single nucleotide polymorphisms (SNPs). Once it was determined that individuals possess variations in their genetic makeup and that these variations may be associated with risk for disease, it became desirable to identify the specific sequence variations in people with various diseases. At the same time, it was recognized that variability in one genetic sequence could predict variability at another locus, sometimes many base pairs away. Analysis of the entire genome with approximately 3 billion base pairs is a daunting task that a few decades ago would have been more than a lifetime of work to accomplish. Now, using 500,000 carefully chosen genetic markers that span the entire genome, it is possible to survey the risk for disease in a few thousand subjects and controls in a fairly short period of time. The purpose of a genomewide association study is to identify 1 loci that are associated with a relatively common but complex disease. Loci are segments of the genome rather than a specific gene. After 1 loci are identified, it is necessary to use additional techniques to narrow in on the region or gene that may be a causal variant. Unlike Mendelian disorders, complex disorders have genetic variants that may interfere with gene-gene interactions, efficiency of translation from mRNA to proteins, regulation of mRNA expression, or other gene-protein interactions.

Reviewer's Comments: There are both advantages and disadvantages to using genomewide association studies to identify disease susceptibility loci. One of the most significant benefits is that it does not require the investigator to have a hypothesis regarding the likely cause of the disease. Although many genes and their functions have been identified, picking one of these genes as a potential candidate gene for a disease is like making a slightly educated guess. It is important to understand that a genomewide association study does not identify disease genes. It identifies loci or regions of the genome that are associated with disease. Identification of genes or specific genetic variants requires fine mapping of the identified locus.

Additional Keywords: Human Disease

print tag: Refer to original journal article.
Although uncommon in children, the plunging ranula may rapidly enlarge and result in dysphagia and respiratory distress requiring definitive diagnosis and surgical excision of the affected sublingual gland.

**Background:** The plunging (cervical) ranula is defined as a mucus extravasation pseudocyst that arises exclusively from the sublingual salivary gland and results when mucus escapes through or behind the mylohyoid muscle along the fascial planes into the cervical, submandibular, or submental spaces. If large, they can affect swallowing, speech, and breathing, and the definitive treatment is complete surgical excision of the affected sublingual gland.

**Objective:** To examine and evaluate the diagnosis and surgical management of the plunging ranula in children.

**Participants/Methods:** This retrospective study included 129 subjects, 82 males and 47 females, with a mean age of 12 years, who were assessed and treated for plunging ranula at Xi'an Jiaotong University and Sichuan University between 1990 and 2005. Diagnosis included patient history and clinical assessment followed by fine needle aspiration cytology (FNAC) using an extraoral approach to establish a definitive diagnosis. Radiographic investigations were not conducted. All cases were treated with surgical excision of the ipsilateral sublingual gland using an intraoral approach following drainage, aspiration, and partial removal of the oral pseudocyst.

**Results:** 56% of plunging ranulas were found on the left side compared to 40% on the right. Only 8% of the sample exhibited a history of head and neck trauma, 35% had undergone previous surgery, and in 57%, the etiology was unknown. No surgery was performed involving a neck incision and no patient had the pseudocyst in the submandibular region removed. The investigators postulated that the plunging ranula may arise from a defect or dehiscence of the mylohyoid muscle. In all cases, the preoperative diagnosis obtained by FNAC was verified by histopathologic analyses. The follow-up period for all patients ranged from 30 to 48 months, and no long-term complications were reported and no recurrences found at follow-up.

**Conclusions:** The plunging ranula is rare in children and seldom resolves spontaneously. Definitive diagnosis utilizing FNAC has proven successful especially in those cases without oral involvement. Intraoral surgical excision of the ipsilateral sublingual glands and drainage of the pseudocyst has shown to be the safest and most effective treatment technique and is associated with the lowest morbidity and absence of recurrence.

**Reviewer’s Comments:** Considering that the cervical or plunging ranula is uncommon and when found, most often occurs in patients during the third decade, this retrospective study presents an excellent sample size of children who were examined, diagnosed, treated, and followed over a 15-year period. There was a good follow-up period, mean of 36 months, for all patients without any recurrence or increased morbidity found. However, there were no statistical analyses presented or comparisons of findings to similar studies. The authors presented an excellent description of the surgical management options for the lesion along with the potential risks.

**Additional Keywords:** Management

**print tag:** () Refer to original journal article.
Articaine 4% vs Lidocaine 2%

Comparison of Anesthetic Efficacy of 4% Articaine and 2% Lidocaine for Maxillary Buccal Infiltration in Patients With Irreversible Pulpitis.

Srinivasan N, Kavitha M, et al:

Articaine 4% may be better for infiltration anesthesia in adults and older children although it is more toxic than lidocaine 2%.

**Background:** Articaine is the most commonly used anesthetic agent in Germany, Italy, the Netherlands, and Canada. It was introduced in the United States in 2000 and has been gaining in popularity, although lidocaine is still the most popular agent.

**Objective:** To compare the anesthesia efficacy of 4% articaine and 2% lidocaine (both with 1:100,000 epinephrine) for buccal infiltration anesthesia.

**Design:** Prospective, randomized, double-blind study.

**Participants:** 40 subjects, 20 with irreversible pulpitis in a first premolar and 20 in a first molar, were randomly assigned in a double-blind manner to receive either 4% articaine or 2% lidocaine.

**Methods:** Endodontic access was begun 5 minutes after administration of the anesthetic agent. Success was defined as either no or mild discomfort by visual analog scale (VAS) recordings during the endodontic procedure.

**Results:** The success rate for articaine was 100% in both the premolar and molar groups. For 2% lidocaine, the success rate was 80% in the premolar group and 30% in the molar group.

**Conclusions:** The efficacy of 4% articaine was superior to 2% lidocaine for maxillary buccal infiltration anesthesia in posterior teeth.

**Reviewer’s Comments:** This is a well-designed and conducted study in adults with a mean age of 29 years. The authors pointed out that the lower concentration of lidocaine (2%) compared to articaine (4%) may have contributed to the lesser success. However, the authors did not discuss the increased toxicity of articaine (4%) to lidocaine (2%). In addition, although this study was performed on adults, the authors did not mention that the manufacturer does not recommend the use of articaine in children <4 years of age.

**print tag:** () Refer to original journal article.
Etching Primary Teeth for Shorter Periods--Is It Better?

*Effect of Acid Etching Time on the Degradation of Resin-Dentin Bonds in Primary Teeth.*
Sanabe ME, Kantovitz KR, et al:
*Am J Dent;* 22 (February): 37-42

If using a total etch technique in primary teeth, etching longer may not be better; it may be worse.

**Background:** When I trained in pediatric dentistry years ago, it was believed that 120 seconds of acid etching primary tooth enamel was required to obtain an etching effect equal to that of 60 seconds on permanent tooth enamel. Now as adhesive formulations have advanced, we have almost universally migrated to a 15- or 20-second etching time with a combined or total etching technique. With more recent introductions of self-etching adhesive primer systems, the timing of application may be more complex. In addition, few (if any) studies are performed looking at possible distinctions in performance with different etching times between primary and permanent teeth.

**Objective:** To look at a standard manufacturer's recommended 15-second etching time, with either a total etching phosphoric acid technique or a self-etching primer adhesive technique, in terms of performance of adhesives over time and their resistance to bond degradation in primary molars.

**Methods:** 40 non-curious exfoliated primary molars were divided into 4 study groups. Two of the groups were treated with the total etch technique using the product Single Bond, with 1 of the groups etched only for 7 seconds and the other for the manufacturer's recommended 15 seconds. The other 2 groups were treated with Clearfil SE Bond, a self-etching primer adhesive, with 1 group treated for the manufacturer's recommended 20 seconds of surface application and the other with a shortened time of 10 seconds. Microtensile bond strength measurements were made to determine the long-term bond degradation effects within each of the test groups after 24 hours, 6 months, or 12 months after bonding and after storage in either distilled water with an antibacterial agent or with mineral oil. This was done to examine the absence of a hydrolytic degradation effect.

**Results:** The immediate bond strengths were no different after 24 hours between the 4 groups. After 12 months of storage in water, bond strengths with the self-etching primer adhesive were higher than in either of the total etch groups. After 6 months of storage in water, bond strengths in the total etch group were lower than with self-etching only with the longer 15-second total etch time. For the self-etching primer adhesive, the application time did not affect bond degradation. Additionally, storage in mineral oil revealed no difference in bond degradation between any of the 4 groups after 12 months.

**Reviewer's Comments:** This study shows that, based on differences in primary tooth dentin, it may be important to not over-etch, particularly when using the total etch technique in primary teeth. We must always question whether manufacturers have tested their products in primary teeth in addition to permanent teeth.

Additional Keywords: Primary Teeth

print tag: () Refer to original journal article.
Alcohol-based hand sanitizers are effective and present minimal risk to children as a result of unintended exposure.

**Background:** The use of alcohol-based hand sanitizers is increasing. The active ingredient in these products is ethyl alcohol, often in the range of 60% ethanol by weight. Purposeful ingestion to achieve intoxication has been reported.

**Objective:** To characterize the acute impact that the exposure of these products might have on children.

**Design:** Retrospective descriptive study of database information.

**Methods:** The Texas Poison Center Network consists of 6 regional poisons centers in the state. A database of incidents has been maintained. All cases involving alcohol-based hand sanitizers were retrieved and reviewed. The data collected included age, gender, type and/or brand of alcohol-based hand sanitizer involved, exposure quantity, route of exposure, demographics, and medical outcome. Routes of exposure included "dermal", "ocular," "ingestion," "aspiration/inhalation," and "other."

**Results:** In 2006 and 2007, there were 826 and 1022 unintended exposures, respectively. Of these exposures, approximately 80% were in children <6 years of age and 90% were ingestions. There were no deaths, and most exposure outcomes were rated minor and in a few instances, moderate. Between 2002 and 2007, the reported exposures doubled. The limitation of this study is that not all unintended exposures are reported to a poison center.

**Reviewer's Comments:** Alcohol-based hand sanitizers are popular and effective. Reductions in absenteeism due to gastrointestinal and respiratory illnesses have been attributed to their use. While there has been an increase in unintended pediatric exposures, it has resulted in little or no toxicity. The risk of any significant purposeful intoxication is minimal.

**Additional Keywords:** Unintended Exposure

(print tag: ) Refer to original journal article.
Mother's SOC May Help Understand Child's Oral Health and Behavior

Relationship Between Mothers' Sense of Coherence and Oral Health Status of Preschool Children.

Bonanato K, Paiva SM, et al:
Caries Res; 43 (April): 103-109

It is time to investigate mother's ability to deal with stressful situations.

Objective: To determine if mothers' sense of coherence (SOC) has any effect on the oral health status in a group of 5-year-old children.

Design: Cross-sectional design with dental examination of children and SOC survey of mothers.

Participants/Methods: 5-year-old children were selected from the capitol city of the state of Mina Gerais, Brazil. Randomization followed to ensure sample representation. Subjects had an oral examination at school by 2 calibrated examiners using artificial light and disposable mouth mirrors. Caries, filled teeth, missing teeth, exposed pulp, root fragments, gingivitis, calculus, and visible plaque were recorded. Mother's SOC was measured using the short version of Antonovsky's SOC 13 scale (SOC-13); and the Social Vulnerability Index (SVI) recorded.

Results: 546 of the 636 surveys were returned for a response of 85%; children ranged in age from 60 to 71 months, with a mean of 66 months. Mothers' SOC was a median of 47.5 (with 65 being the most stressed); SVI was 0.45, with 1 being the most vulnerable. Findings from the children's dental examination included decay (36%), pulp involved (9%), root fragments (5%), filled teeth (14%), missing teeth (4%), visible plaque (45%), gingivitis (19%), and calculus (9%). Mother's SOC was associated with a greater prevalence of dental caries, a 1.59-fold greater chance of cavities, a 1.99-fold greater chance of pulp exposures, and a 1.85-fold greater chance of filled teeth. Children with low SVI were 1.7 times more likely to have dental disease, 3.2 times more likely to have pulp involvement, and 6.2 times more likely to have root fragments.

Conclusions: Mother's SOC and the SVI of the family have a strong influence on the child's oral health and may be a strong psychosocial determinant of oral health.

Reviewer's Comments: AAPDs Caries Risk Assessment Tool (CAT) has 3 components, and in 1 component, the health history and the families' socioeconomic status are considered. It may be time to add the SOC of the mother based on this reviewed report and others from the earlier literature.

Additional Keywords: Social Vulnerability/Caries Risk

print tag: () Refer to original journal article.
**Long-Term Impact of Premature Birth**

*Mind the Gap: The Unique Neurodevelopment of Extremely Low Birth Weight Infants.*

Berger I:

*Israeli Med Assoc J; 10 (October): 718-721*

Premature birth is, by itself, a risk factor for neurodevelopmental delay.

**Background:** The main cause of long-term disability in infants is premature birth. The development of assisted reproductive technology/in vitro fertilization, the potential for birth even with advanced maternal age, and the technological advances in neonatology/perinatology have all led to improved prognoses for premature infants, with rates as high as 70% globally. However, these children often face a lifetime of illness and neurodevelopmental delay. Cerebral palsy, epilepsy, and blindness are diagnosed in as many as 25% of extremely low birth weight (ELBW) children. In fact, it has been noted that prematurity is in and of itself a neurodevelopmental risk factor, even in the absence of severe disability. Conditions classically associated with prematurity, such as intraventricular hemorrhage, periventricular leukomalacia, and bronchopulmonary dysplasia, are all potential causes of severe brain injury. The brain of an ELBW infant is particularly sensitive as total brain volume and cortical gray matter all increase significantly between 29 and 41 weeks of gestation. Therefore, even in the absence of major systemic illness, variations in nutrition, metabolic function, blood pressure, and external (environmental) stress can retard neurodevelopmental progress. When followed longitudinally, subjects aged 12 to 25 years, who were born premature, had lower IQ results and overall lower academic performances. These children also tended to demonstrate significantly higher rates of psychopathologies, social incompetence, and attention deficit/hyperactivity disorder.

**Reviewer's Comments:** As pediatric dentists see children at 12 months and younger, it is imperative to have an understanding of the impact of birth history and gestation on the long-term development of the child. Potentially, children with a complicated birth history/prematurity may be more prone to behavioral and physiologic disturbances that can impact the delivery of clinical care and treatment options, such as oral sedation. This review does a good job of painting a picture of the premature/ELBW infant and the lifetime of illness they may face.

**Additional Keywords:** Chronic Illness

**print tag:** Refer to original journal article.
Discoloration Associated With Pulp Revascularization

Reynolds K, Johnson JD, Cohenca N: Int Endod J; 42 (January): 84-92

Discoloration is a potential outcome associated with pulp revascularization of immature teeth.

Background: Going back to the late 1970's, a body of literature has established the regenerative potential for a damaged or necrotic pulp. This technique has, since the late 1990s/early 2000s, been described in teeth with immature roots. The revascularization (RV) of an immature tooth requires: (1) disinfection of the canal space; (2) scaffold placement to allow for tissue in-growth; and, (3) a bacterial resistant seal to prevent microleakage coronally.

Objective: To describe the classic "triple antibiotic paste" (metronidazole, ciprofloxacin, and minocycline) developed in 1996. This combination (and variations) has since been shown to induce RV of immature teeth allowing for continued root formation and thickening of dentinal walls. Previous papers have also commented on the potential for discoloration during RV, specifically due to minocycline in the triple antibiotic paste.

Results: This paper describes the case of an 11-year-old Asian girl with bilateral dens evaginatus (tubercule cusps) on lower second bicuspsids. Upon access into necrotic pulps, a root canal projector was placed into the canal and flowable resin placed around the projector. A 20-gauge needle was inserted into the projector space and the antibiotic paste was delivered below the cemento-enamel junction. One month later, bleeding was induced with a size 20 K-file, and ProRoot grey MTA was placed on the resulting clot to complete the process. Both teeth continued their normal development, although some coronal discoloration was noted and attributed to the grey MTA.

Reviewer's Comments: This article attempts to address a significant issue related to revascularization using the classic Hoshino formulation. Some have suggested discoloration related to minocycline and have indeed questioned its use in the triple antibiotic formulation, while others have looked to the MTA and its placement as a potential cause. This paper presents another successful case report of RV, but highlights issues that, particularly in the anterior, can be of clinical significance.

Additional Keywords: Pulp Revascularization

print tag: () Refer to original journal article.
Staff Education Key in Managing BP-Related Jaw Necrosis

Rayman S, Almas K, Dincer E:
Int J Dent Hygiene; 7 (May): 90-95

The most common dental comorbidity associated with bisphosphonate use in adults is periodontitis.

Bisphosphonates

**Summary:** Bisphosphonates (BPs) are a class of medications used to treat conditions such as Paget's disease, cancers, and lymphoproliferative disorders. They can be classified as nitrogenous (N) or non-nitrogenous (NN). NN BPs are taken up by osteoclasts and result in cell apoptosis. N BPs block osteoclastic adherence to the surface of bone. The use of BPs is a predisposing factor in the development of osteonecrosis of the jaw (ONJ). ONJ is, in essence, death of bony tissue. Previous studies have reported that as many as 5% of IV BP users may develop ONJ. In fact, the overwhelming majority (94%) of reported ONJ cases are associated with IV BP use, with only 6% being linked to oral BP use in adults. The most common dental comorbidity reported is clinically and radiographically present periodontitis noted in 84% of cases. Hyperbaric oxygen has proven effective in the treatment of osteoradionecrosis. Evidence has shown that BPs may be retained in therapeutic dosage in bone for several years following drug administration. This may significantly impact treatment planning for dental patients, particularly those requiring invasive extractions or surgical procedures.

**Reviewer's Comments:** This article provides a good basic overview of the use and mechanisms of BPs use. A key underlying theme is that staff education on the management of these patients is required, as the half-life of these medications mean they are still bioactive years after initial administration. BPs are a class of medication that dentistry will to have to contend with on a more intimate basis in the future as more childhood conditions (such as osteogenesis imperfecta) are treated with BPs.

**print tag:** Refer to original journal article.
How Early Can We Tell There's a Problem With GERD in Children?

GERD or Not GERD: The Fussy Infant.
Bhatia J, Parish A:
J Perinatol; 29 (May): S7-S11

Arching of the back during feeding is a potential clinical sign of GERD.

**Background:** Gastroesophageal reflux disease (GERD) has been defined as a "condition which develops when reflux of stomach contents cause troublesome symptoms and/or complications." These symptoms can include; vomiting, poor weight gain, dysphagia, esophagitis and respiratory disorders, as well as dental erosion. While the overall prevalence has been placed at approximately 10% to 20% in Western Europe and North American, GER is most common in infancy, occurring in 50% of infants 0 to 3 months of age and reducing to 5% in children 10 to 12 months of age. Clinical signs of GERD with symptoms include anorexia, painful swallowing, or arching of the back during feeding. The most valid measure of reflux is the reflux index, which is the percentage of time the esophageal pH is below 4. For a child 10 to 12 months of age, the normal reflux index is 12%. Changes in formula used (a common myth remedy for GERD) does not decrease symptoms. While prone positioning may provide relief from GER, there is an increased risk of sudden infant death syndrome, and so supine positioning is recommended. Histamine-2 receptor antagonists (H2RAs) reduce GERD symptoms as well as promote healing of esophagitis, and proton pump inhibitors work even better. Surgery is often a last resort for children with GERD when pharmacotherapy fails. A fundoplication, such as a Nissen in conjunction with a gastric feeding tube is the most common surgical approach and is often used when there is concomitant neurological injury.

**Reviewer's Comments:** I have mentioned before that with the advent of the year 1 dental visit and the rise in infant oral health practices, dentists need to be aware of potential health issues affecting young children and infants. GERD can be a significant health problem for children with a profound oral impact. Aside from dental erosion, feeding habits can be altered that can affect the salivary pellicle and oral microflora. This article provides a good foundation for types of questions that practitioners might ask parents or potential referrals that dentists might make for young children with suspected reflux.

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Is a Bonding Agent Superior to a Resin Sealant for Preventing Microleakage?

Microleakage of an Adhesive System Used as a Fissure Sealant.
Bonifacio CC, Navarro RS, et al:
J Contemp Dent Practice; 10 (March 1): 26-33

Adhesive systems used per manufacturer's instructions have potential application as pit and fissure sealants.

Background: Effective marginal seal, integrity, and retention are all critical to the success of pit and fissure sealants (PFSs). A reduction in any of these can lead to microleakage, an indication that the adhesion process has been unsuccessful. PFSs are integral in modern preventive dentistry by reducing biofilm load in occlusal crevices and other pits. PFSs not only serve as pre-carious prevention, but have also arrest active carious lesions in situ.

Objective: To evaluate in vitro microleakage of resin PFSs versus adhesive systems used as a sealant.

Methods: Noncarious intact primary molars were used to compare 4 groups; resin sealant; adhesive system; resin sealant + primer; and, resin sealant + bond. Following material application according to the manufacturer's instructions, teeth were stored in distilled water for 24 hours and then thermocycled to simulate expected in vivo thermal conditions at the tooth-restoration interface. Microleakage was evaluated in a laboratory at the conclusion of the 24-hour period.

Results: 40 teeth were used (10 per group). Data collected revealed the highest microleakage in the sealant + primer group, and lowest microleakage in the PFS group. PFS + primer + bond had significantly lower microleakage than the PFS + primer group. There was no significant difference between the PFS group and the PFS + primer + bond group, and there was no significant difference between the PFS group and the primer + bond group.

Conclusions: The use of a primer + bond adhesive system did not result in higher microleakage when compared to a PFS.

Reviewer's Comments: While this study was technically well done, the most glaring weakness is the sample size. It is difficult to make a conclusion based on 10 teeth per group. Furthermore, the literature on bonding to primary enamel suggests weaker bond strengths than with permanent tooth counterparts, which makes the clinical application of this paper somewhat limited. These were done under ideal "dry conditions," which is not always the case in a child, and if there is any doubt as to isolation, perhaps use of a concentrated topical fluoride, such as varnish may be a better clinical option.

Additional Keywords: Microleakage

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Insurance Status Might Not Be as Significant a Factor in Dental Utilization

*Medical and Dental Care Utilization and Expenditures Under Medicaid and Private Health Insurance.*

Ku L: *Med Care Res Rev*; (April 23): epub ahead of print

There is no significant difference in dental expenditures between Medicaid and privately insured children.

**Background:** There is a belief that private insurance is inherently more effective for dental care due to the drive of market forces. This belief sits in the middle of the debate as to whether increased insurance access/utilization should be done through private or public (ie, government run) means. A challenge to the Medicaid patient is finding participating providers due to historically low reimbursement rates. Medical expenditures are classically the product of utilization and payment/reimbursement rates.

**Objective:** To evaluate whether the type of insurance coverage is an enabling factor that directly impacts health care (specifically dental) utilization.

**Methods:** Data were collected from the Medical Expenditure Panel Survey (MEPS) for 2005. This nationally based survey project is run by the Agency for Healthcare Research and Quality (AHRQ). The study focuses on low-income, nonelderly adults and children with incomes at or below 200% of the federal poverty line; in 2005, this translated to $32,180 for a family of 3.

**Results:** Medicaid members had overall poorer health status and poorer mental health status. They were more likely to have chronic health problems, be female, be part of a minority group, unemployed, and have less education. There were 13.5% of Medicaid children 0 to 18 years of age who had chronic health conditions compared to 10.1% of the private insurance cohort. Medicaid children had significantly fewer dental visits, but there was no significant difference in adjusted estimated yearly dental expenditures between the Medicaid ($220) and private insurance children ($211).

**Reviewer's Comments:** This is a dense article that requires careful reading, but is well worth it. One inference that can be drawn is that dental disease and access to care is not simply a "Medicaid" issue, but an issue for all children, as the utilization rates were not significantly different. An interesting dichotomy is the fact that while there were fewer visits for the Medicaid children, utilization/reimbursement rates were not significantly different. I wonder if possibly "more" services are done per visit on Medicaid children to maximize utilization. I would liked to have seen these data broken down further by age cohort, as my suspicion is that there is variation in utilization changes with age (ie, a greater disparity as children get older). The 2007 Centers for Disease Control and Prevention data highlights (28% caries rate in 2- to 5-year-olds) that for younger children, insurance status may not be as much of a barrier as access, finding a dentist who will welcome them into a dental home.

**Additional Keywords:** Medicaid/Private Insurance

**print tag:** () Refer to original journal article.
Airway Dysfunction in Young Children More Common Than Thought

The Relationship Between Early Respiratory Viral Infections and Subsequent Wheezing and Asthma.

Panitch HB: 
Clin Pediatr Phila; 46 (June): 392-400

Approximately 30% of children have airway compromise as long as 6 years post-viral infections in infancy.

Summary: This classic article by Dr. Howard B. Panitch tells us that wheezing is a positive indicator of airway obstruction. Risk factors for wheezing diseases include compromised respiratory function, passive smoke exposure, family history of atopy, and a history of viral lower respiratory infections. Wheezing occurs in as many as 34% of all children from 0 to 3 years of age. If there are risk factors, such as a parental history of atopy, rates can go as high as 51%. Wheezing is a common symptom associated with asthma, which is characterized by bronchial hyper-responsiveness. The most common wheezing disease of infancy is bronchiolitis. When causes of wheezing have been evaluated in children, a viral etiology has been noted in as many as 85% of cases. The most common virus to contribute to wheezing and asthma exacerbation in young children is respiratory syncytial virus (RSV). RSV is the most common cause of bronchiolitis (BR) requiring hospitalization. Infants who have been hospitalized for BR have high rates (as high as 70%) of recurrent wheezing and asthma for as long as 1 year after infection, and 30% have recurrent lower respiratory infections or recurrent wheezing 6 to 8 years after their initial infection.

Conclusions: The timing of a viral respiratory infection may significantly impact respiratory tract-associated morbidity well after the initial infection.

Reviewer’s Comments: This review presents a wonderful overview of something that needs to be carefully considered when treating children, particularly with pharmacotherapy (such as conscious oral sedation), and that is namely airway development and health. The younger a child is when diagnosed with a viral respiratory illness, the more likely it is that some long-standing compromise may exist in airway function. RSV in particular is something that all dentists who see children during early childhood need to be aware of.

Additional Keywords: Wheezing & Asthma

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**What Is the Role of Streptococcus mutans?**

*Bacteria of Dental Caries in Primary and Permanent Teeth in Children and Young Adults.*

Aas JA, Griffen AL, et al:  
*J Clin Microbiol*; 46 (April): 1407-1417

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**Background:** Historically, there have been 3 major hypotheses as to the etiology of dental caries: the specific (Sp); nonspecific (NSp); and ecological plaque hypotheses (ECp). The ECp puts forth the idea that caries is a result of a shift in the balance of the resident microflora driven by changes in local environmental conditions. Previous studies have demonstrated complex bacterial colonies that differ in healthy and carious subjects (and by whether they were primary or permanent teeth).

**Objective:** To: (1) determine the bacterial species associated with oral health and disease and (2) to describe the shifts in microflora and the resulting impact on health.

**Methods:** 2 groups were included: Primary teeth (caries, 15 subjects and controls - 14 subjects) and permanent teeth (caries - 36 subjects and controls - 25 subjects). Plaque was taken from 4 distinct sites; intact enamel, white-spot lesions, cavitated dentin lesions, and deep-dentin lesions. Samples were subject to clonal analysis and gene sequencing.

**Results:** The bacterial profiles during the initiation of caries were more complex than those in established lesions. Streptococcus mutans and Actinomyces species were particularly high in caries initiation. In both the primary and permanent dentitions, Streptococcus salivarius and Streptococcus parasanguinis were at high levels. Lactobacilli and S. mutans were noted in established deep lesions.

**Reviewer's Comments:** This study addresses a provocative and clinically relevant topic, namely, what is the flora that determines the initiation and progression of caries. It highlights the fact that the area of research is nascent and of significant impact to prevention counselling. This study makes an effective point that before vaccines directed solely at S. mutans can be effective, we need to have a more complete picture of the bacterial colonies that exist in dental health and disease.

**Additional Keywords:** Oral Flora

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ECC in Asia -- the Product of Feeding Practices

Risks for Early Childhood Caries Analyzed by Negative Binomial Models.

Thitasomakul S, Piwat S, et al:

J Dent Res; 88 (February 1): 137-141

Incidence density is 2 times higher between 12 and 18 months compared to between 9 and 12 months.

Background: Children in Southeast Asia are subject to a very different culture, living styles, and child-rearing practices than their Western counterparts. The prevalence of early childhood caries (ECC) still remains high.

Objective: To identify ECC risk factors among 9- to 18-month-old children in Thailand.

Design: Longitudinal observational study.

Methods: Mothers with children born between November 2000 and October 2001 were included. A clinical examination was conducted and a questionnaire interview was completed. Three main outcome measures were noted; crude caries increment (CCI), which was the number of sound surfaces that converted to carious surfaces, incidence density (ID), which was the number of new caries-affected surfaces per surface-time at risk and finally, incidence density ratio (IDR), which was the ratio of incidence density for predictor variable.

Results: Data were collected from 495 mother-children dyads at 3 time intervals (9, 12, and 18 months). The overall decayed/missing/filled teeth (dmft)/decayed/missing/filled surfaces (dmfs) increased with age between 9, 12, and 18 months. The incidence density between 12 and 18 months was nearly 2 times higher than that between 9 and 12 months. The incidence density was significantly higher in children whose mothers had poor oral health (10 decayed teeth), were not fed cooked rice by age 3 months, and had their food sweetened or allowed them to have sugary food by age 5 months. It is of note that in Thailand, children have a high incidence of high-frequency breast feeding (5 feedings in the day and 4 at night); the reason for this is reported to be delaying maternal fertility.

Conclusions: Postnatal ECC risk factors for children in Thailand include child-rearing practices, age of sweetening of food, and the frequency and nature of snacks.

Reviewer's Comments: This article confirms what exists in the literature with Western populations. Of interest is that practice of high-frequency breast feeding practices to delay fertility. It is expected that children's decay rates would increase with age, as there are more teeth in the mouth to 'be decayed'. One potential weakness of this study is the inclusion of dmfs ratings in the absence of radiographs or notation if all contacts were open.

Additional Keywords: Negative Binomial Models

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Challenges Facing the Oral Health of Children in Rural Communities

Do Children in Rural Areas Still Have Different Access to Health Care? Results From a Statewide Survey of Oregon’s Food Stamp Population.
DeVoe JE, Krois L, Stenger R:
J Rural Health; 25 (Winter): 1-7

One-third of the children living in rural communities have difficulty accessing dental care.

**Background:** During the 1990’s, a body of literature established that there were disparities in pediatric health care based on rural versus urban residences. Significant barriers remain, such as lack of primary care providers, over utilized and undermanned safety net clinics, and travel distances.

**Objective:** To evaluate whether there had been any changes in the rural-urban access disparity since the 1990’s.

**Methods:** A self report, mail-return survey asked eligible parents about their child's access to health care over the previous 12 months. All surveyed families were enrolled in the Oregon food stamp program. The primary predictor variable was the child's residence by zip code (rural or urban). The outcome variables were: no usual source of care, unmet health care needs during past 12 months, prescriptions not refilled, problems with dental care, emergency department visits, and delayed urgent care visits.

**Results:** Data were collected from 26,000 families and weighted back to the full food stamp enrollment of 84,807. Insurance type (parental and child) were most significantly related to measures of access. Rural children having a special health care need were significantly associated with unmet medical, dental, and prescription needs. The rural children, irrespective of insurance, had higher emergency department (ED) utilization rates than urban children. A weighted value of 60% of rural children with no insurance had significant difficulty accessing dental care. The difficulty rural children with special health care needs had in accessing dental care was double that of urban children.

**Conclusions:** Health care policies need to target the poorly insured or uninsured children living in rural communities, particularly if they had special health care needs.

**Reviewer’s Comments:** This article addresses a topic often over looked, where the child lives as a disease modifying factor. Rural children have access issues that are acutely connected to insurance status, while some issues (such as whether they had special needs) transcended insurance status. The design was fairly ‘tight’ and the study did not over reach when making conclusions. Living in a rural community poses a significant health care burden to children, particularly with respect to dentistry and particularly if they had special health care needs.

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